DOCUMENT RESUME

ED 140 705 HE 008 990

AUTHOR	Conger, Darius
TITLE	New Directions in Higher Education.
INSTITUTION	Central Michigan Univ., Mount Pleasant.
PUB DATE	76
NOTE	132p.
AVAILABLE FROM	Central Michigan University, Mount Pleasant, Michigan 48858
EDRS PRICE	MF-$0.83 HC-$7.35 Plus Postage.
DESCRIPTORS	Accountability; *Bibliographies; *Change Strategies; *College Graduates; *Curriculum Development; *Delivery Systems; *Educational Demand; Educational Supply; Employment Opportunities; Futures (of Society); Higher Education; Inflation (Economics); Labor Market; Literature Reviews; Nontraditional Students; Relevance (Education); Student Mobility; Vocational Education
IDENTIFIERS	*Central Michigan University

ABSTRACT

In view of the current demand for curriculum development and evaluation, relevance in source offerings, and overall accountability, Central Michigan University studied the literature on curriculum changes and conducted interviews on the topics. The report has two major objectives: to identify the projected needs of society (i.e., the numbers of college and university graduates needed over the next decade and the mix of skills required by them), and to review and evaluate emerging program areas for the decades ahead, including the clientele to be served and the delivery systems required. Specific topics covered include: the demand for higher education; new courses and degree programs; changes in campus life; university finances; vocationalism; 18 to 20 year-old age cohorts; nontraditional students; migration patterns; unemployment among college graduates; salaries; underemployment; on-the-job training; institutionalization and the diffusion of knowledge; inflation; labor market; and indicative planning. A 21-page bibliography is included. (LBH)

Documents acquired by ERIC include many informal unpublished materials not available from other sources. ERIC makes every effort to obtain the best copy available. Nevertheless, items of marginal reproducibility are often encountered and this affects the quality of the microfiche and hardcopy reproductions ERIC makes available via the ERIC Document Reproduction Service (EDRS). EDRS is not responsible for the quality of the original document. Reproductions supplied by EDRS are the best that can be made from the original.

ED140705

NEW DIRECTIONS
IN HIGHER
EDUCATION

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION
THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

HE 008 990

A Report Prepared by
Darius Conger
Summer, 1976

PREFACE

Curricula have been continually broadened and deepened at both the undergraduate and graduate levels. Yet those knowledgeable in curriculum development often spend more time discussing form than content. Professional journals devoted a disproportionate amount of space on curriculum to strategies for initiating change and circumventing faculty and administrative inertia.

Considerably less time and space were devoted to asking and answering the question "Why should curricula be modified?" Recent events suggest that this question can no longer be ignored. Students are increasingly demanding "relevance" in course offerings, employers are requiring more sophisticated levels of professional skills from new college and university graduates, legislatures are requiring accountability from those receiving state and federal funds and society is questioning the wisdom of substantial investments in higher education for its young which, when completed, result in unemployed and underemployed university graduates rather than fully productive members of the labor force.

Satisfying these disparate demands will not be easy; they go beyond the question of curriculum changes. Is higher education necessary for a substantial majority of the population? Should institutions of higher education provide a liberal education, professional training, or some optimal combination of both? What role should society, government, employers and students play in determining university policies? The list could be expanded many times.

To explore several of these questions and to examine the literature on curriculum changes in general and to Central Michigan University in particular, a report was commissioned by the Provost on directions for new programs, on June 9, 1976. A review of the existing literature was undertaken immediately and interviews were held with the Acting Vice Provost for Administration, the Vice Provost for Instruction and Research, the Deans and/or Associate Deans of the several schools, and the Director of Placement. Informal talks with a number of interested faculty members and administration personnel were also very beneficial. To all of these, my sincere thanks.

The assumptions that underlay the report were threefold: first, Central Michigan University would not significantly change its stated purposes; second, the financial position of the University on a per student basis would not change appreciably; third, the state legislature and the Board of Education would discourage overlapping instructional services in higher educational institutions in Michigan.

Within these confines, the report had two major charges. The first was to identify the projected needs of the society. Specifically, this charge dealt with the numbers of college and university graduates needed over the next decade and the mix of skills which would be required by these graduates. And at the local level, which of these skills is Central Michigan University currently equipped to provide or should become equipped to provide.

The second charge was to review and evaluate emerging program areas for the decades ahead. In addition to identifying new or emerging program areas, it was also necessary to examine what clientele would be served by offerings in these areas and what delivery systems would be required to meet demands in these areas.

Finally, although not a charge, the report highlights a number of the findings by putting forth a number of ideas for potential action regarding curriculum in the decades ahead. These ideas are designed to be "talking points," which, it is hoped, will encourage additional discussion about future programs at all levels of the University. As is usual with these studies, I was left entirely to my own devices. There were no hints that my salary or advancement opportunities would be adversely affected by the inclusion or ommission of any pet projects. All the more true, then, is the customary caveat that no one but myself should be held accountable for the views expressed herein.

CHAPTER I

RECENT CHANGES IN HIGHER EDUCATION

Although this report is future oriented, the changing environment to which institutions of higher education have had to adapt in the past decades identify the changes taking place in higher education and highlight certain areas where change is felt to be desirable. This chapter, and the two which follow it, surveys some familiar ground and offers some new material. But old or new, it is essential for the development of later chapters since the future is to a greater or lesser degree an extension of the past. All chapters follow a similar format. The discussion and data are used to illustrate new or changing areas. The potential of these areas is examined and their impact explored. Finally, a section on exogenous factors is presented. These are potential developments deemed inimical to higher education but outside the control of educational administrators and faculty.

DEMAND FOR HIGHER EDUCATION

College students have been recruited largely from recently graduated high school students. This age cohort began to grow rapidly in the early 1960's as the first of the so-called war babies reached college age. In addition, higher percentages of those entering high school subsequently graduated and the college participation rate--the number of high school graduates enrolling in an institution of higher education--also began rising. Thus, the demographic impact had a multiplier effect on higher education, resulting in dramatic growth in university enrollments, SCH produced and faculty necessary to accommodate this growth. Table I-1 shows that while the number in the eighteen-to-twenty-one-year-old age cohort increased 158.22 percent from 1962 to 1976, the number of high school graduates increased by 186.44 percent. The number enrolling for the first time in a college or university increased by 229.78 percent and the increase in SCH generated was up 255.60 percent over the same period. Clearly, the most significant change in higher education in the past two decades has been its increase in size.

This dramatic growth rate is not, howevever, expected to continue indefinitely. Enrollment potential from the traditional student will reach a peak in the 1980's and decline for at least a decade thereafter. Because increases in the fertility rate of young couples would have no impact on college enrollments until the mid-1990's the higher educational establishment in the United States is said to be operating under an immutable "birth sentence," from which there is no appeal.[1] "1970," wrote Allan Cartter, "would have been a good year to have received tenure."[2]

---

[1] Walter P. Metzger. "The American Academic Profession in 'Hard Times'," Daedalus, Winter, 1975, p. 35.

[2] Allan N. Cartter, "Whither the Market for Academic Economists," American Economic Review, Vol. LXI, #2 (May, 1971), p. 309.

TABLE I - 1

PROJECTIONS OF TRADITIONAL COLLEGE-AGE POPULATION, HIGH SCHOOL GRADUATES, AND STUDENT CREDIT HOURS (SCH) GENERATED, 1962-1992

YEAR	COHORT 18-21 AGE*	HIGH SCHOOL GRADUATES*	FIRST-TIME COLLEGE ENROLLMENT*	TOTAL SCH GENERATED*
1962	10,493	1,925	1,031	39,864
1963	10,879	1,950	1,046	42,468
1964	11,088	2,290	1,225	47,088
1965	11,880	2,665	1,442	53,316
1966	12,546	2,672	1,378	57,504
1967	13,098	2,680	1,439	62,016
1968	13,773	2,702	1,630	67,128
1969	13,654	2,839	1,699	70,692
1970	14,541	2,978	1,803	74,904
1971	14,864	3,090	1,885	79,992
1972	15,297	3,210	1,990	84,096
1973	15,621	3,306	2,083	88,476
1974	15,966	3,389	2,170	92,664
1975	16,346	3,563	2,316	97,572
1976	16,602	3,589	2,369	101,892
1977	16,796	3,634	2,435	105,900
1978	16,889**	3,633	2,470	109,320
1979	16,855	3,705**	2,556	112,056
1980	16,755	3,669	2,569**	114,336
1981	16,596	3,658	2,561	115,776
1982	16,408	3,588	2,512	116,136**
1985	14,953	3,162	2,213	107,208
1992	13,811	3,069	2,148	97,992

* Thousands
** Peak Year

SOURCE: Allan M. Cartter, "The Academic Labor Market," in Margaret S. Gorden (ed.), Higher Education and the Labor Market, New York: McGraw-Hill Book Company, 1974, p. 293.

NEW COURSES AND DEGREE PROGRAMS

A second major change impacting higher education is the great proliferation of new courses and degree programs available to students. Partly this growth is a statistical anamoly stemming from the decision to include junior colleges and technical institutes together with four-year undergraduate and graduate institutions.[3] But much of this expansion is real, stemming from the advancement of knowledge in all areas, the development of new professional specialties demanded by a modern economy and the desires of students to pursue new areas of specialization or sub-specialization. This proliferation was possible, especially at the junior, senior and graduate levels, by ever-increasing freshman and sophomore enrollments and the growth in federal and state expenditures for higher education.

Table I-2 illustrates the general trend of increasing numbers of courses offered in selected disciplines and increasing sub-specializations (as evidenced by junior-senior course offerings) within disciplines. Undoubtedly, as the economy grows in complexity and scientific work proceeds, the number of sub-specialities within major fields will continue to grow. Although these tables fail to reflect it, the number of major disciplines has not increased substantially. Rather, there appears to have been a continual deleting of defunct courses and additions of new courses within major disciplines.[4] Analyses of curriculum at the nation's leading universities suggests that major discipline changes have been minor. Emerging disciplines such as business administration, education, engineering to some extent and the large number of vocational programs appear to be the almost exclusive domain of smaller state universities and colleges.[5]

---

[3] Beginning with the Nixon Administration, educational institutions above high school were lumped together under the amorphus title "Institutions of Higher Education."

[4] Laurence Veysey, "Stability and Experiment in the American Undergraduate Curriculum," in Carl Kaysen (ed.), Content and Context: Essays on College Education, New York: McGraw-Hill Book Company, 1973, p. 48.

---

[5] Ibid., p. 47.

TABLE I - 2

	BERKELEY						YALE						CMU					
	1950		1960		1970		1950		1960		1970		1950		1960		1976	
	By Type		By Type		By Type		By Type		By Type		By Type		By Type		By Type		By Type	
	LD	UP	LD	UP	LD	UP	LD	UD	LD	UD	LD	UD	LD	UD	LD	UD	LD	UD
CLASSICS	13	18.5	10	19	10	29	9	20	6	24	7	29	24	35	19	43	21	47
ECONOMICS	4	35	3	34	2	35	4	28	2	44	10	58	2	13	3	17	5	21
EDUCATION		39		26		16	2	2					7	29	5	48	6	31
FRENCH	7	21	7	24	11	32	6	22	6	24	6	28	10	6	6	9	6	17
GEOLOGY	3	20	5	21	3	29	5	11	5	11	5	14	-	-	3	8	7	20
HISTORY	8	61	10	70	15	69	6	34	15	58	12	126	7	22	8	41	21	44
MATHEMATICS	20	42	16	44	15	71	12	15	12	15	16	20	19	10	24	16	21	10
PHILOSOPHY	7	22	6	29	10	45	3	25	8	17	20	50	2	5	3	9	10	13
PHYSICS	11	17	8	18	13	27	10	16	8	18	14	16	10	13	10	18	17	8
PSYCHOLOGY	5	39	4	38	5	45	6	12	3	22	2	56	2	23	1	26	8	18
SLAVIC LANG.	11	26	12	14	25	26	4	8	4	16	4	27	-	-	-	-	6	5
SOCIOLOGY	4	23	4	27	2	40	2	24	2	23	7	24	6	150	8	22	13	28

SOURCE: Laurence Veysen, "Stability and Experiment in the American Undergraduate Curriculum," in Carl Kaysen (ed.), Content and Context: Essays on College Education, New York: McGraw-Hill Book Company, 1973, pp. 32-34.

CHANGES IN CAMPUS LIFE

Campus life has undergone much change in the last two decades. In loco parentis is no longer a widely recognizable phrase among undergraduates, dress codes and on-campus housing restrictions have largely disappeared and open visitation and co-educational dormitories have taken their place. More significantly, perhaps, today's student is less likely to be traditional in terms of age, more likely to be attending school while working at least part-time, less likely to complete his or her undergraduate program without a period of absence from the campus and less likely to be concerned with traditional campus activities such as school dances but more likely to be concerned with student rights.[6]

These changes reflect a variety of factors. Societal attitudes, especially as regards dress and sex, have been relaxed. Economic conditions have brought inflation to the campuses, with tuition, fees and books increasing in price and forcing more students to work. But most importantly, college and universities are no longer regarded as training grounds for the elite. Higher education is now perceived as one method of ensuring equality of opportunity in society.[7] Student loans, special grants, the GI Bill, and fellowships have made the attainment of an undergraduate degree possible for many whose family financial position previously precluded it. And the growing number of remedial and preparatory courses, especially in junior colleges, allows those students with academic deficiencies to eventually matriculate in a college or university if they so desire.

---

[6] Daniel Yankelovich. The New Morality - A Profile of American Youth in the 70's, New York: McGraw-Hill Book Company, 1974.

[7] R.W. Fleming, "Reflections on Higher Education." Daedalus, Fall, 1975, p. 8.

UNIVERSITY FINANCES

Since the early 1970's, the financial position of higher education has become increasingly tenuous, reflecting the deepest economic recession since 1937 and rates of inflation exceeding 10 percent in recent years. Universities are particularly hard-hit by such developments because of their dependence on governmental revenues for substantial portions of operating budgets and because of their inability to substitute low-cost for high-cost resources.[8] Tenure, collective bargaining on campus and fear of erosion of educational quality by increasing class size dictates that labor costs, which comprise three fourths of operating budgets, are rigid downward. It can be hoped that both the recession and high inflation are transitory in nature, but the potential for enrollment declines and the competing claims for government revenues dictate that higher education will not soon be the recipient of the kind of flow of funds which took place during the "post-Sputnik" era of the 1960's.

VOCATIONALISM

The most recent phenomenon to reach higher education is that of vocationalism. Vocationalism is broadly viewed as encompassing trade school and associate degree programs and narrow (as opposed to liberal arts) four or five year undergraduate programs. It is perhaps a natural concommitant to the declining rate of return on a college degree. In greater and greater numbers students are demanding not those skills which will equip them to become informed and well-rounded individuals in a modern society, but skills which will ensure their employability following graduation. If the student body is dichotomized into those who view college as a steppingstone to career advancement and those who are primarily interested in the intangible benefits of a college education, the size of the former group has risen to 66 percent in 1973, from 55% in 1968.[9] In a recent sample of college-age individuals, those surveyed were asked to identify a series of ways of completing a baccalaureate degree. Nearly half (48%) chose the option which combined work in the major field and university enrollment simultaneously over a six-year period.[10]

---

[8] June O'Neill, "Resource Use in Higher Education: Trends in Output and Inputs, 1930-1967," Sponsored Research of the Carnegie Commission on Higher Education, New York: McGraw Hill Book Company, 1975, p. 303.

Student predilictions toward vocational training are bolstered by the hiring practices of employers. A survey of the hiring practices of 100 companies in 1965 showed that 62% were interested in hiring liberal arts majors (a substantial percentage of all graduates) for their available positions. Of the same 100 companies in 1972, only 19% expressed interest in hiring a liberal arts major.[11] A broader spectrum of employers shows similar imbalances between hiring practices and the distribution of graduates by major.

These imbalances, which put upward pressure on the starting salaries of those graduating in high-demand majors (especially business and engineering), reinforce the notion that the more specific the training received as an undergraduate, the greater the likelihood of success in the job market.

---

[9] Yankelovich, The New Morality.

[10] The College Placement Council, Inc. Four-Year Liberal Arts Graduates, Bethelehem, PA.; The CPC Foundation, 1975, p. 3.

[11] Ibid., p. 9.

SUMMARY

1. The numbers of traditional college-age students will begin to decline in the early 1980's. Higher educational institutions must either plan for smaller size after that time or reach into new areas for students.

2. The number of courses and types of degrees conferred will continue to be flexible, reflecting the changing demands of society for types of college educated personnel.

3. In the relatively near term, campuses will continue to attract larger numbers of non-traditional students. Whether such students can offset the declining numbers of traditional students expected by the early 1980's will depend in large part on the initative of individual schools and the types of programs they make available.

4. Higher education will recover from the extreme financial straits of the early 1970's, but will not return to the opulent years of the Post-Sputnik era. There will be therefore, continued attention to cost-effectiveness in operating old programs and initiating new ones.

5. The movement toward greater equity in pursuing higher education will continue. This suggests that the number of vocationally-minded students in college will continue at historically high levels. The competition for entry-level jobs following graduation will generally be keen through the mid-1980's as large age cohorts pass through universities and into the labor market and employers become more specific in filling vacancies.

CHAPTER II

DEMOGRAPHIC REALITY VERSUS ENROLLMENT POTENTIALS

18-21 YEAR-OLD AGE COHORTS

Due to the declinining fertility rates which began in the late 1950's and early 1960's, we know with certainty that the size of the traditional college age cohorts will peak in 1978 and, regardless of what happens to birth rates from this point forward, will decline until 1992, dropping from 16,889,000 to 13,811,000 or by close to twenty percent.[12] For Michigan, the decline is somewhat smaller, from a high of 799,047 in 1978 to 898,635 in 1990, a decline of nearly thirteen percent.

Nationally, the number of high school graduates will continue to rise until 1979, when they will peak out at some 3,705,000 and will thereafter decline by over seventeen percent by 1992 to 3,069,000. First time college enrollments are expected to continue to rise until 1980, reaching a peak of 2,569,000 and declining by 1992 to 2,148,000---a drop of some sixteen percent. However, student credit hours will not peak until 1982 (at 116,136,000), but will decline thereafter by about 15.5 percent to 97,992,000 by 1992. For planning purposes, Table II-1 shows Central Michigan University anticipating these national trends by several years, with first time freshman enrollments peaking in 1978 at 3,789 and declining by over seventeen percent by 1986 to 3,115.

---

[12] These and all other national statistics are taken from Table I-1, p. 3.

However, because of a projected tendency by CMU students toward fewer credit hours per semester, more temporary withdrawals and lower summer school attendance, fiscal year equated student enrollment is projected to peak at 15,182 in 1976-77 and decline by 1986-87 to 14,397 or by slightly over five percent.

TABLE II - 1*

ENROLLMENT PROJECTIONS FOR CENTRAL MICHIGAN UNIVERSITY, 1976-77 TO 1986-87

YEAR OR FISCAL YEAR	18-21 YEAR OLD MICHIGAN AGE COHORT	PROJECTED CMU FRESHMAN	PROJECTED CMU FISCAL YEAR EQUATED STUDENTS
1976-77	3,500	15,182	786,015
1977-78	3,728	14,866	792,520
1978-79	3,789	14,807	799,047
1979-80	3,681	14,741	798,393
1980-81	3,656	14,690	790,662
1981-82	3,560	14,665	777,010
1982-83	3,410	14,695	767,775
1983-84	3,251	14,682	749,376
1984-85	3,233	14,582	740,807
1985-86	3,183	14,535	734,208
1986-87	3,115	14,397	719,626

*SOURCE: Raymond N. Kieft, "Assumptions for Planning: University Enrollment, 1976-77 through 1985-86"; Unpublished Manuscript, August, 1976, p. 5 and p. 20 and Raymond N. Kieft, "Assumptions for Planning: University Student Credit Hour and Fiscal Year Equated Student Enrollment, 1976-77 through 1986-87"; Unpublished Manuscript, August, 1976, p. 14.

Institutions such as Central are thought to be more adversely affected by such state and national trends because of their reputation as producers of large numbers of graduating teachers. To the extend that future teachers carry the majority of their course work outside the School of Education, all schools within the University suffer to some extent by the declining demand for new teachers. Table II-2 illustrates the percentages of graduates in selected majors who were teacher certified for the 1974-75 academic year. Loss of undergraduate students with certification goals need not represent a net loss of students as other majors will continue to fill courses in all disciplines. However, a differential impact may be expected, especially at the junior and senior levels. Techniques such as Induced-Course-Load Matrices and shift-share analysis can be utilized to trace out these differential impacts for staff and planning purposes.[13]

TABLE II - 2

ACADEMIC FIELD SUPPORT FROM SCHOOL OF EDUCATION, 1974-75, SELECTED FIELDS

		NON-TEACHING		TEACHING	
MAJOR	TOTAL*	NUMBER	%	NUMBER	%
BIOLOGY	70	38	54.29	32	45.71
CHEMISTRY	10	7	70.00	3	30.00
ENGLISH	49	5	10.02	44	89.80
FOREIGN LANG.	22	3	13.64	19	86.36
GEOGRAPHY	5	4	80.00	1	20.00
HISTORY	41	3	7.32	38	92.68
MATHEMATICS	53	9	16.98	44	83.02
POLITICAL SCI.	29	7	24.14	22	75.86
SOCIOLOGY	51	41	80.39	10	19.61
SPEECH	30	4	13.33	26	86.67

SOURCE: Placement Annual Report 1974-1975
*Includes only those registered with Placement Center

---

[13] The techniques, applied to CMU, are shown in James R. Moor, Jr., Shift/Share Analysis Applied to Department-Specific Enrollment"; unpublished manuscript, October, 1975 and Raymond N. Kieft, "Assumptions for Planning: Academic Unit Enrollments, 1976-77 through 1981-82," unpublished manuscript, August, 1976.

Projections such as those described above, based largely on the technique of trend-demographic analysis, are based on a number of "as is" assumptions. Specifically, the number of high school graduates as a percent of those in the age cohort eligible to graduate from high school will stay as it is or follow an historical trend, the college participation rate will stay as it is or follow an historical trend, etc. Stephen Dresch, in his analysis of such projections concludes:

> The fundamental limitation of these analyses resides in their consideration only of the demographic side of the system, that is, of prospective changes in the size of the college-age population, assuming a simple perpetuation of past enrollment trends. They explicitly ignore (a) the capacity of the broader system (economy) to absorb the college education, for example, the patterns of change in the inter-industry composition of employment (a factor overemphasized by the manpower planners); and (b) the effect on the overall supply of highly educated persons of the rapid growth in the college-age population from the late 1950's to the mid-1970's, especially considering the fact that this bulge followed a decline in the college-age population caused by the extremely low birth rates of the 1930's.[14]

What is often overlooked once forecasts have been promulgated is that the success of predictions lies in their ex post facto incorrectness. The inaccuracy of a prediction implies that it was taken seriously and the "as is" conditions were consciously modified in a favorable way. Researchers as yet cannot fully model, for purposes of meaningful forecasts, the multiplicity of factors which at the margin induce a student to attend a college or university. It is known that war and peace, the level of employment and unemployment, the distribution of income, the family socio-economic status, peer group fashions, changing birth rates (by creating the so-called sibling squeeze), shifts in values and, most importantly, the kind of higher education offered and the terms on which it is available all play a part in enrollment decisions.[15] Several of these factors strongly suggest that the impact of declining numbers of 18-21 year olds may be considerably mitigated.

---

[14] Stephen P. Dresch, "Demography, Technology and Higher Education, Toward a Formal Model of Educational Adaptation," Journal of Political Economy, Vol. 83, #3 (June, 1975), p. 537.

Defensive Educational Expenditures

In the past it has been an article of faith that the most recalcitrant potential freshman could be induced to enroll by making him or her aware of the lifetime earnings differential between college and high school graduates. The baccalaureate degree was a good investment, often earning in excess of ten percent rate of return.[16] Today, in the face of unemployment and underemployment of recent university graduates, rate of return calculations are mentioned in hushed tones, if at all. Otherwise, students, whose intuitive knowledge of the workings of the labor market is quite astute, will eschew higher education for a job immediately upon graduation from high school or undertake vocational training of considerably shorter duration than the Bachelor's degree.

By this logic, the impact of declining college age cohorts will be exacerbated as the college participation rate will itself decrease.

---

[15] Howard R. Bowen, "Teaching and Learning: 2000 a.d." New Directions in Higher Education, #42, (Winter, 1975), p. 3.

[16] Many of these studies are summarized in John M. Campbell, Jr. and Thomas P. Curtis, "Graduate Education and Private Rates of Return: A Review of Theory and Empiricism", Economic Inquiry, Vol. XIII, #1 (March, 1975) and Richard S. Eckhaus, Ahmad El Safty and Victor D. Norman, "An Appraisal of the Calculations of Rates of Return to Higher Education," in Margaret S. Gordon, Ed., Higher Education and the Labor Market, New York: McGraw-Hill Book Company, 1974.

Viewed somewhat differently, however, the increasing percentage of the labor force in possession of a college degree makes the attainment of that degree even more imperative for the new labor force entrant.[17] What becomes important is the lifetime earnings potential of a high school graduate who does not eventually complete an undergraduate degree when a substantial portion of those in the same age cohort do complete the degree. Possession of the degree becomes a defensive mechanism, allowing the individual to maintain his or her relative income position within a given age cohort. The relative income position of previous college graduates is not an important factor in making an enrollment decision. Higher educational expenditures, viewed as defensive in nature, suggest that the participation rate of future 18 to 21 year olds should rise, not fall.

Educational Widening

Closely related to education as a defensive expenditure is educational widening, i.e., the admission of more individuals from each age cohort.[18] Such widening has occurred in the recent past with the advent of the junior or community colleges whose clientele was often predominantly those whose secondary educational attainments or financial position precluded attendance at a four-year institution. Educational widening is also consistent with the increasing egalitarianism of college enrollment.

---

[17] Education as a defensive mechanism designed to protect market shares is found in Lester Thurow, "Education and Social Policy," *The Public Interest*, No. 28, Summer, 1972.

[18] The terms "educational widening" and "educational deepening" are taken from the Bowen source cited in footnote 15.

The enrollment potentials of educational widening appear substantial. Today nine of ten students in a given age cohort enter high school and eight of the nine eventually graduate. Of the eight who graduate, five will enroll in some institution of higher education and two will graduate.[19] Clearly there are significant enrollment potentials from policies designed to increase the college participation rate.

Such policies need not imply a concommittant decrease in the ability levels of freshman classes or that junior and community colleges will be the primary beneficiaries of these potential enrollments. For every 100 students of high ability from families with high socio-economic status who graduate from high school, 90 go on to college and 63 eventually graduate. But for every 100 students of equally high ability from families with low socio-economic status, only 69 go to college and only 32 graduate.[20] We have some way to go before the opportunity to pursue a university education is equally available to all those who are educationally qualified.

Educational Deepening

Educational deepening occurs when the number of students transferring from community colleges to senior colleges increases, when fewer college freshmen drop out before graduating, and when more senior college and university graduates continue on for advanced degrees.

---

[19] U.S. Office of Education, Digest of Educational Statistics, 1968, p. 8.

[20] John K. Folger, Helen S. Astin and Alan E. Bayer, Human Resources and Higher Education. New York: Russell Sage Foundation, 1970, p. 322.

Although the number of transfer students is projected to remain stable over the next five years at Central, by the mid-1980's increasing our share of students could partially offset declining freshman enrollments.

The potential for educational widening is especially promising for female undergraduates who, especially from lower socio-economic status families, exhibit lower probabilities of attending college than similarly situated males unless there is a college or university located at or very near their residence.[21] As sex discrimination in the labor market lessens and as all students increasingly come from families whose parents were college graduates, marked differences in enrollment probabilities by sex should disappear.

---

[21] Sandra Christensen, John Melder and Burton A. Weisbrod. "Factors Affecting College Attendance." Journal of Human Resources, Vol. X, #2, p. 184.

NON-TRADITIONAL STUDENTS

The greatest possibilities for educational widening and deepening are found among the non-traditional students, i.e., among those not in the 18 to 21 year-old age cohort. If the "as is" projections continue, by 1990 21.7 per cent of the labor force will have received between one and three years of college and 40.5 percent will have graduated from high school but will have received no college credits. The total market potential, shown in Table II-3, exceeds 50 million persons, drawn from three separate groups: late starters, career upgraders, mid-life career switchers.

TABLE II - 3

TOTAL NON-TRADITIONAL MARKET POTENTIAL

AGE	1980			1985			1990		
COHORT	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
25-34 Years	19,251	12,227	7,024	21,740	13,837	7,903	22,478	16,305	7,173
35-44 Years	12,454	7,588	4,866	16,126	9,873	6,253	19,690	12,112	7,578
45-54 Years	9,822	5,563	4,259	10,474	6,883	3,591	12,497	7,137	5,360
55-64 Years	7,351	4,173	3,178	7,755	4,349	3,406	7,705	4,295	3,410
65 & Over	1,362	779	583	1,646	949	697	1,883	1,074	809
TOTAL	50,240	34,936	15,304	57,741	40,497	17,244	64,253	40,923	23,330

Source: Dennis F. Johnston, "Education of Workers: Projections to 1990," Monthly Labor Review, Vol. 93, #11 (November, 1973), Based on Table 3, pp. 25-26.

Late Starters[22]

This group comprises over half the potential non-traditional market (See Table II-4). Persons in this group will have graduated from high school and are technically able to enter a university but have failed to do so, either because they lacked the means to do so immediately following high school, failed to appreciate the benefits of doing so, or some combination of the two. Because of the large pass-through of post-war babies in the 1960's and 1970's, these persons will be largely segregated in the 35 and over age cohort.

TABLE II - 4

ENROLLMENT POTENTIALS FROM NON-TRADITIONAL CLIENTELE: HIGH SCHOOL GRADUATES ONLY

AGE	1980			1985			1990		
COHORT	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
25-34 Years	11,088	6,940	4,158	11,996	7,590	4,406	11,960	7,598	4,362
35-44 Years	7,915	4,553	3,362	9,735	5,683	4,052	11,431	6,750	4,681
45-54 Years	6,575	3,442	3,133	6,934	3,656	3,278	7,941	4,280	3,661
55-64 Years	5,037	2,689	2,348	5,235	2,730	2,505	5,120	2,659	2,461
65 & Over	844	480	364	1,068	612	456	1,227	679	458
TOTAL	31,469	18,104	13,365	34,968	20,271	14,697	37,679	26,572	11,107

SOURCE: Denis F. Johnston, "Education of Workers: Projections to 1990," Monthly Labor Review, Vol. 93, #11 (November 1973), pp. 22-31. Based on Table 3, pp. 25-26.

---

[22] Anne M. Young, "Going Back to School at 35," Monthly Labor Review, Vol. 96, No. 10, October, 1973.

Career Upgraders

Persons seeking additional education in order to upgrade their careers may be expected to come predominantly from that group which has enrolled for at least one year of college but never completed a degree. Such individuals have lower opportunity costs of attending (less time to complete degrees) and potentially higher benefits than the late starters. It is expected that they took jobs slightly better than those with only high school diplomas and are at or nearing their optimal advancement levels without a degree. This market contains between 10 and 15 million people (See Table II - 5).

TABLE II - 5

COLLEGE COMPLETION MARKET POTENTIAL: ONE TO THREE YEARS OF COLLEGE

AGE	1980			1985			1990		
COHORT	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
25-34 Years	4,629	3,155	1,474	5,501	3,786	1,715	5,920	4,109	1,811
35-44 Years	2,565	1,714	851	3,596	2,411	1,185	4,649	3,135	1,514
45-54 Years	1,853	1,164	689	2,014	1,261	753	2,588	1,619	969
55-64 Years	1,419	904	515	1,486	933	553	1,465	906	559
65 & Over	297	165	132	330	183	147	374	216	158
TOTAL	10,763	7,102	3,661	12,927	8,574	4,353	14,996	9,985	5,011

SOURCE: Dennis F. Johnston, "Education of Workers, Projections to 1990," Monthly Labor Review, Vol. 93, #11, (November, 1973), pp. 22-31. Based on Table 3, pp. 25-26.

Mid-Life Career Switching

Those changing careers after a few years in the labor market do not fall into clear-cut classifications. They range from housewives seeking degrees in order to enter or re-enter the labor force to individuals shifting careers within a given industry (engineering to management for example) to early retirees seeking a second vocation.[23] Therefore, many may come from that pool identified above as late starters and career upgraders. However, among all these groups, those having graduated from college have the lowest costs of returning for a second degree for reasons similar to those of the career upgraders. The lowest opportunity costs within this group will be for early retirees, who are likely to have retirement income which would allow them to attend a university full time. As Table II-6 illustrates, this group contains between 8 and 11 million persons and is likely to provide the bulk of future graduate students as well (See below).

While this potential market is quite large, there is no assurance that institutions of higher education can attract students from it in any large numbers. In 1974, Table II-7 shows only 1½ million persons over 35 were enrolled in some type of educational institution, but nearly a million of them were enrolled in college, with 30 percent of those in college classified as graduate students. Among these groups identified above, the college participation rate is currently low, but among participators there is a clear preference for college over vocational schools. As mentioned earlier, college attendance is partially dependent on the type of education offered and the terms on which it is offered. It may well be that new delivery systems--off-campus courses, individualized instruction packages, computerized training and work site television sections--will be necessary to attract such students.

---

[23] A fuller discussion of this potential clientele can be found in Peter A. Morrison, The Demographic Context of Educational Policy Planning, Report P-5592, Santa Monica: The RAND Corporation, 1976. Some of the special educational problems of this group are discussed in Nona Boren, KaiMay Yuen Terry and Michael McCally, "Second Careers: An Integrated Learning Experience in Career Change for Older Persons," Industrial Gerontology, Vol. 3, #2 (Spring, 1976).

TABLE II - 6

GRADUATE SCHOOL MARKET POTENTIAL: FOUR YEARS OF COLLEGE, BUT NO GRADUATE WORK

AGE	1980			1985			1990		
COHORT	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE
25-34 Years	3,524	2,132	1,392	4,243	2,461	1,782	4,598	2,578	2,020
35-44 Years	1,974	1,321	653	2,795	1,779	1,016	3,610	2,227	1,383
45-54 Years	1,394	957	444	1,526	1,009	517	1,968	1,238	730
55-64 Years	895	580	315	1,034	686	348	1,120	730	390
65 & Over	221	134	87	248	154	94	282	179	103
TOTAL	8,008	5,124	2,884	9,846	6,089	3,757	11,578	6,952	4,626

SOURCE: Dennis F. Johnston, "Education of Workers. Projections to 1990," Monthly Labor Review, Vol. 93, #11, (November, 1973) pp. 22-31. Based on Table 3, pp. 25-26.

TABLE II - 7

LABOR FORCE STATUS OF PERSONS ENROLLED IN REGULAR SCHOOL BY TYPE OF SCHOOL, AGE AND SEX, OCTOBER 1974 (000'S)

TYPE OF SCHOOL AND AGE	BOTH SEXES Population	BOTH SEXES Labor Force Number	BOTH SEXES Labor Force %	BOTH SEXES Not in Labor Force	MEN Population	MEN Labor Force Number	MEN Labor Force %	MEN Not in Labor Force	WOMEN Population	WOMEN Labor Force Number	WOMEN Labor Force %	WOMEN Not in Labor Force
Enrolled in School	1,100	873	79.4	227	504	443	89.7	61	596	430	72.1	166
Elementary of High School	80	53	66.3	27	30	21	70.0	9	50	32	64.0	18
College	1,020	820	80.4	200	474	422	89.0	52	546	398	72.9	148
Full Time	209	105	50.2	104	106	64	60.4	42	103	42	40.8	61
Part Time	811	715	88.2	96	368	358	97.3	10	443	356	80.4	87
Undergraduate	735	574	78.1	161	322	288	89.4	34	413	286	69.2	127
Graduate	285	246	86.3	39	152	134	88.8	18	133	112	84.2	21
35 - 39 Years	425	339	79.8	86	227	198	87.3	29	198	141	71.2	57
40 - 44 Years	286	227	79.4	59	131	118	90.1	13	155	110	71.0	45
45 Years & Over	389	307	78.9	82	146	127	87.0	19	243	179	73.7	64

SOURCE: Anne McDougall Young, "Going Back to School at 35 and Over" Monthly Labor Review, Vol. 98, No. 12. December, 1975, p. 48.

Graduate Students

The 1975 seminar report on Graduate Education at Central Michigan University noted that "Graduate enrollment, while very dependent upon undergraduate enrollment as a base, is also very sensitive to the marketplace forces."[24] This is increasingly so as larger percentages of the labor force are in possession of a baccalaureate degree. All employers risk losing their investment in a newly hired employee should he or she prove unsatisfactory, regardless of the amount of education possessed by that employee. The costs, however, are greater the higher the educational attainments of the employee, as additional degrees command additional salaries. For this reason, employers are increasingly post-selecting those who will stay with a firm with an advanced degree.[25] Post-selection occurs whenever employers hire at the baccalaureate level and then send back to school those employees whom they think could benefit the company by additional training. On the rate of return basis, the Master's degree following at least one year of full time employment earns its recipient a two or three percent higher rate of return than an employee who takes the same job with a Master's degree in hand.[26] For this reason, undergraduate enrollment may be less important as a source of graduate students in the future. On-campus graduate enrollments as a percent of total graduate enrollments at Central exhibit a slight downward trend, which may already indicate a declining importance of undergraduate enrollments as a base for supporting graduate studies.

---

[24] Edmund Benson, et. al. Graduate Education at Central Michigan University: Purpose, Problem, Potential. Mt. Pleasant; Central Michigan University Press, 1975, p. 7.

[25] Lewis M. Branscomb and Paul C. Gilmore "Education in Private Industry"; Daedalus, Winter, 1975, p. 228.

[26] Richard J. Agnello and Joseph W. Hunt, Jr. "The Impact of a Part-Time Graduate Degree and Early-Career Earnings on Late-Career Earnings" The Journal of Human Resources, Vol. XI, #2, p. 216.

EXOGENOUS FACTORS: MIGRATION

Outmigration can cause projections of future student populations to err by substantial margins, since almost all projection models assume net migration patterns to remain constant. Recently, however, net migration patterns are working against schools like Central which draw the majority of their clientele from large standard metropolitan statistical areas (SMSA'S) such as Detroit. For the first time in the postwar period, large SMSA's (over 3 million persons) are experiencing net outmigration. Further, the declining birth rates have meant that natural population increases are unable to keep up with the net outmigration and as a result, these SMSA's are either not growing or are declining. The Detroit SMSA has exhibited virtually no growth since 1970.[27]

Even a no growth scenario for cities is worse than appears on the surface. For large SMSA's the total income of in-migrants from 1970-1974 was $25.7 billion, but for out-migrants over the same period total income was $55.3 billion. The steady state population resulted in a net loss of income (and also tax base) of nearly $30 billion.[28]

---

[27] Vincent P. Barabba. "The National Setting: Regional Shifts, Metropolitan Decline, and Urban Decay" in George Sternlieb and James W. Hughes, eds. Post-Industrial America: Metropolitan Decline and Inter-Regional Job Shifts, New Brunswick: Center for Urban Policy Research, 1975, p. 48

[28] George Sterlieb and James W. Hughes, "Prologue" in Sternlieb and Hughes, Ibid., p. 9.

Out-migrants tend to be more highly educated than in-migrants and hence take with them children who would be most likely to attend college following high school. Furthermore, migration patterns are significantly affected by real wages and unemployment levels. Both the cost of living and the levels of unemployment in Detroit and all of Michigan are above national averages.[29]

If future migration patterns continue in the directions suggested above, then the traditional student at Central is more likely to be in need of financial aid and/or part-time employment while attending. Non-traditional student potential will be much lower, owing to the decline in the number of professional workers in the Michigan pool. Either of these contingencies will require some re-thinking of enrollment projections and, quite possibly, methods of operation.

---

[29] For the effects of these variables and a forecasting population model for the Detroit SMSA see James R. Moor, Jr. "An Economic-Demographic Forecasting Model for the Detroit Region," Unpublished dissertation, Wayne State University, 1975.

SUMMARY

1. The number of individuals in future 18-21 year-old age cohorts will continue to decline at least through the early 1990's. Education deepening and widening, however, imply that college and university enrollments need not decline as rapidly.

2. The number of individuals over age 25 who are potentially eligible to enroll in an institution of higher education is substantial. Among this group, those now attending some type of educational institution clearly prefer college to vocational training. The college participation rate within the group, however, is currently quite low. New delivery systems may be able to raise this participation rate, in which case the non-traditional student enrollments could more than offset declining enrollments among the 18-21 year-old age group.

3. Migration patterns for Michigan in general and the Detroit SMSA specifically point to lower numbers of both traditional and non-traditional students. Even a steady state population for Michigan and Detroit suggests a changing mix of students, with lower socioeconomic backgrounds and possibly more educational deficiencies in future freshman classes.

CHAPTER III

VOCATIONALISM: THE MYTH AND THE REALITY

"Today's freshmen," noted a recent newspaper article on the freshman class of 1976, "show a decidedly practical streak. Some of the most dramatic increases in applications and enrollment are occurring in small schools catering to a specific need, or at career-oriented technical colleges and two-year community colleges."[30] This vocationalism suggests that students believe two things to be characteristic of today's labor market: (1) the more narrow the specialization, the greater the probability of employment and/or the higher the starting salary; (2) a specialization can be chosen during the freshman year which, upon completion of a degree at some time in the future, will still be in short supply. It is not clear whether either or both of these conditions prevail. This chapter examines these two questions in light of the experience of two recent graduating classes: the 1961 age cohort (graduating in 1965 or 1966) and the 1966 age cohort (graduating in 1970 or 1971). Supplemental data is provided for other age cohorts or specific markets where available. The two age cohorts are particularly well suited for this purpose as the 1961 cohort graduated at a time of excess demand for college graduates while the 1966 cohort graduated during a time of perceived excess supply of college graduates and during a period of recession as well.

---

[30] Philip Revzin. The Wall Street Journal, April 14, 1976, p. 32.

UNEMPLOYMENT AMONG COLLEGE GRADUATES

As a method of ensuring employability, higher education is an excellent investment. In March, 1975, at the nadir of the recent recession, unemployment among college graduates was less than one-third that of the national average (See Table III-1). These aggregate unemployment figures, however, mask considerable variance in employability by length of experience and type of major. Table III-2 shows that the 1961 cohort experienced considerably lower unemployment rates than the 1968 cohort at the time of the survey. Differences by major indicate that biological sciences, arts and humanities, social sciences and business graduates experienced higher unemployment rates in both age cohorts. Interestingly, women were more often than not experiencing higher unemployment rates than men within the 1961 cohort, but within the 1968 cohort the differential was nearly zero and in many cases reversed. This no doubt was the result of government efforts to end sexual discrimination in the labor market.

TABLE III - 1

UNEMPLOYMENT RATES, BY EDUCATIONAL ATTAINMENT: MARCH, 1975

	Percentage Unemployed
High School	
1-3 Years	15.2 %
4 Years	9.1%
College	
1-3 Years	6.9%
4 Years or More	2.9%
College: 4 Years or More	
Women	3.6%
Men	2.5%
Non-White	2.8%
National Average	9.2%

Source: John D. Shingleton, "The Job Market and a College Degree," *The Michigan State Economic Record*, V. 18, #2, p. 2.

TABLE III - 2

UNEMPLOYMENT RATES, BY UNDERGRADUATE MAJOR AND SEX: 1961 AND 1968 COHORTS, IN PERCENTAGES

	1961 Cohort			1968 Cohort			
	Unemployed but Looking for a Job			Looking for job but have received only Unsatisfactory offers		Looking for job but have received no offers	
Undergraduate Major	Total	Men	Women	Men	Women	Men	Women
Total, All Majors	2	1	3	7	7	11	11
Arts & Humanities	4	4	4	7	10	21	10
English	3	1	5	--	--	--	--
Languages	1	*	2	--	--	--	--
Other	5	6	4	--	--	--	--
Social Sciences	3	2	3	10	7	14	13
Economics	3	3	1	--	--	--	--
Sociology	3	1	5	--	--	--	--
Psychology	1	1	*	--	--	--	--
History	3	4	1	--	--	--	--
Other	3	1	6	--	--	--	--
Biological Sciences	5	2	11	8	8	11	15
Physical Sciences	2	2	1	5	5	9	10
Education	1	1	1	4	5	4	11
Engineering	1	1	4	5	--	7	-
Business	3	1	10	7	5	8	12
Other	*	*	*	--	--	--	--

SOURCE: Ann Stouffer Bisconti and Irene L. Gomberg, The Hard-To-Place Majority - A National Study of the Career Outcomes of Liberal Arts Graduates. Bethlehem, Pa.: The CPC Foundation, Report #5, 1975, p. 11.

As the number of graduates experiencing unemployment increases, the difficulty in obtaining jobs by those who are employed should increase. Table III-3 illustrates that the most difficulty in obtaining employment occurs in those major areas which suffer the highest unemployment rates; namely, biological sciences, social sciences and arts and humanities. However, for all disciplines, the 1966 cohort had difficulty finding employment and the differences by major appear small. Again, women experience greater difficulty in obtaining employment than men. What Table III-3 does suggest is that there is a strong cyclical element in the probability of a new labor force entrant obtaining employment and that all disciplines suffer from downturns in economic activity to much the same extent. There is a tendency, in identifying the path of expectations, to weight the most recent past far more heavily than is warranted. The employment quandry of recent graduates may be to a large extent a function of the length and depth of the economic recession of the early and mid 1970's.

TABLE III - 3

PERCENTAGE OF GRADUATES EXPERIENCING DIFFICULTY FINDING CURRENT JOBS: 1961 AND 1966 COHORTS

	1961 Cohort		1966 Cohort	
Undergraduate Major	Men	Women	Men	Women
Total, All Majors	16	16	30	36
Arts and Humanities	23	24	30	41
English	16	32	34	39
Languages	51	13	30	44
Other	18	21	28	40

(Table III-3 Continued)

	1961 Cohort		1966 Cohort	
Undergraduate Major	Men	Women	Men	Women
Social Sciences	19	23	31	48
Economics	13	19	31	44
Sociology	29	33	29	46
Psychology	18	23	32	48
History	19	15	28	45
Other	18	22	33	55
Biological Sciences	26	12	32	41
Physical Sciences	16	18	27	36
Education	9	9	27	29
Engineering	12	7	27	--
Business	16	14	31	34
Other	11	17	28	26

SOURCE: Ann Stouffer Bisconti and Irene L. Gomberg, The Hard-To-Place Majority - A National Study of the Career Outcomes of Liberal Arts Graduates, Bethlehem, Pa.: The CPC Foundation, Report #5, 1975, p. 11.

DEGREE VERSUS CAREERS

If employment is dependent on narrow specialization in a college major, a high correlation would exist between college majors and type of employment, with graduates possessing majors in excess supply to exhibit relatively high unemployment rates. On the other hand, if the primary economic gain from attending college is that it serves as a screening and sorting device, then we would expect the correlation between college major and type of employment to be much weaker.[31] We have already seen that economic downturns impact the employability of all graduates to a similar extent.

Tables III-4 through III-7 distribute the 1961 and 1966 cohorts by major among their 1971 occupations. For men in the 1961 cohort, business and teaching ranked one and two as occupations for almost all graduates.

---

[31] Ivan Berg, Education and Jobs: The Great Training Robbery, Boston: Beacon Press, 1971.

Exceptions were English and others in arts and humanities, others in arts and sciences and biological sciences, who were more likely to enter the "other" occupational category. This category contains the legal and communications professions and several government occupations, which may account for these large numbers. Women in the 1961 cohort were predominantly employed as teachers from all undergraduate majors, with "other" occupations generally second. Female economics, psychology, physical science and business majors, however, were largely employed in business-related activities.

The 1966 male cohort entered a tight labor market and the distribution reflects this, with large numbers of all majors finding employment in the "other" category and those entering trade occupations up substantially in comparison with the 1961 cohort. Females in the 1966 cohort were more likely than their 1961 counterparts to be employed as teachers. This probabily reflects two factors: (1) when economic conditions are good, teachers have favorable employment opportunities outside teaching and often eschew teaching for such opportunities; (2) the rapid increase in the female participation rate among women aged twenty to thirty suggest that many earlier graduating teachers did not seek employment following graduation, but that later graduates are not following this pattern.

What is clear from these tables is that both teaching and business occupations draw their employees from all majors in large numbers. However, professional and science employers draw their employees largely from the natural sciences and engineering. Women, judging from the relatively high numbers in the secretary-clerk category and relatively low numbers in the administrative assistant and business administrator categories, are more likely to be underemployed than men. The lack of a narrow specialty in a college major does not appear to prevent employability, but it does limit the fields to those outside engineering and the physical and biological sciences. The obverse is not true. It does suggest that possession of a degree, rather than a skill, enables the graduate to secure employment. And graduates with narrow specialties were more likely to be employed if they took a number of courses widely divorced from their specialty.[32]

The undergraduate major can be applied in almost any employment area and Table III-8 presents the employers by type of the 1961 and 1966 age cohorts. There are only slight differences in the employers between the two groups, with the 1966 cohort less likely to be self-employed and more likely to be working in education, nonprofit areas, or other areas--which include the various health professions. The most pronounced shift in employment patterns took place in the private companies, where fewer 1966 cohort graduates were employed in mining and manufacturing and more in retail and wholesale occupations. This trend, which is quite pronounced over a longer period than shown in Table III-8, will be discussed in some detail in Chapter V.

---

[32] Ann S. Bisconti and Irene L. Gomberg, The Hard-To-Place Majority: A National Study of the Career Outcomes of Liberal Arts Graduates. Bethlehem, Pa: The CPC Foundation, Report #5, 1975.

TABLE III - 4

DISTRIBUTION OF OCCUPATIONS BY UNDERGRADUATE MAJOR (%):
MEN - 1961 COHORT

Occupation in 1971	Arts & Humanities: English	Arts & Humanities: Languages	Arts & Humanities: Other	Social Sciences: Economics	Social Sciences: Sociology	Social Sciences: Psychology	Social Sciences: History	Social Sciences: Other	Biological Sciences	Physical Sciences	Education	Engineering	Business	Other
Business-Related	25	24	18	56	32	59	36	37	20	32	14	23	81	15
Accountant	2	0	1	4	0	1	*	1	*	1	0	0	25	1
Administrative Assistant	3	*	2	2	1	7	5	3	2	2	4	*	6	2
Business Administrator	16	6	6	27	14	42	21	17	10	7	6	12	31	7
Computer Personnel	1	*	2	5	2	2	4	1	5	19	0	5	8	*
Sales	4	18	7	18	3	7	6	15	3	3	4	6	11	5
Secretary, Clerk	0	0	0	*	12	0	0	0	0	*	0	*	0	*
Professions & Sciences	15	4	20	8	13	7	4	2	6	23	1	64	2	26
Allied Health	0	2	0	0	0	*	0	0	2	*	0	0	0	19
Engineer	0	0	1	*	0	1	0	0	0	9	*	64	1	5
Natural Scientist	--	0	0	1	0	*	0	*	4	13	0	*	*	1
Social Scientist	0	0	*	*	0	1	0	*	0	0	0	0	0	*
Other (artist, clergy, etc.)	15	2	19	7	13	5	4	2	*	1	1	0	1	1
Teaching	22	59	29	15	27	12	29	9	31	26	71	1	3	28
Elementary & Secondary	22	57	28	4	26	11	26	8	31	26	70	1	3	27
College	*	2	1	11	1	1	3	1	0	*	1	*	*	1
Trades	1	1	1	0	2	2	1	6	6	6	0	1	1	4
Other (Military, farmer, etc.)	36	11	34	21	26	20	29	47	35	13	13	11	15	28

TABLE III - 5

DISTRIBUTION OF OCCUPATIONS BY UNDERGRADUATE MAJOR (%):
WOMEN - 1961 COHORT

	Arts & Humanities			Social Sciences					Biological Sciences	Physical Sciences	Education	Engineering	Business	Other
Occupation in 1971	English	Languages	Other	Economics	Sociology	Psychology	History	Other						
Business-Related	19	20	14	67	32	38	26	24	9	50	2	17	50	6
Accountant	*	0	4	2	0	0	1	0	0	2	0	0	15	1
Administrative Assistant	2	6	5	16	3	4	8	7	7	4	0	0	8	1
Business Administrator	4	4	*	20	22	16	12	5	1	4	1	15	12	3
Computer Personnel	3	5	1	18	1	6	*	8	1	37	*	0	5	0
Sales	1	2	1	9	2	3	2	1	*	0	*	2	3	1
Secretary, Clerk	9	3	3	2	4	9	3	3	*	3	1	0	7	*
Professions & Sciences	6	1	12	7	38	29	8	11	61	13	3	55	13	43
Allied Health	*	*	*	0	*	*	0	0	53	5	*	0	0	41
Engineer	0	0	0	0	0	0	0	0	0	3	0	55	0	0
Natural Scientist	*	0	0	2	0	0	0	*	6	5	0	0	0	0
Social Scientist	0	0	0	4	*	0	*	0	0	0	0	0	7	0
Other (Artist, Clergy, etc.)	6	1	12	1	38	29	0	11	2	*	3	0	6	2
Teaching	48	53	49	4	7	9	33	25	23	31	91	0	24	39
Elementary & Secondary	48	52	49	4	7	9	32	24	23	31	91	0	24	36
College	0	1	*	0	0	0	1	1	0	0	0	0	0	3
Trades	0	0	2	0	0	0	*	0	2	1	*	1	0	*
Other (Military, Farmer, etc.)	26	24	26	24	23	25	32	40	5	5	4	27	14	12

SOURCE: Ann Stouffer Bisconti, College Graduates and Their Employers -- A National Study of Career Plans and Their Outcomes. Bethlehem: The CPC Foundation, Report #4, 1075, p. 11.

TABLE III - 6

DISTRIBUTION OF OCCUPATIONS BY UNDERGRADUATE MAJOR (%):
MEN - 1966 COHORT

	Arts & Humanities			Social Sciences										
Occupation in 1971	English	Languages	Other	Economics	Sociology	Psychology	History	Other	Biolog-ical Sciences	Physical Sciences	Education	Engineer-ing	Business	Other
Business-Related	17	15	16	35	36	20	24	23	15	23	3	9	63	19
Accountant	*	0	2	3	*	*	1	*	*	2	0	*	20	1
Administrative Assistant	4	8	2	8	14	7	4	8	9	11	0	2	11	9
Business Administrator	7	1	4	11	8	5	10	11	3	2	*	2	19	5
Computer Personnel	1	*	*	6	2	5	1	0	0	7	0	3	*	2
Sales	4	4	7	6	11	2	7	3	2	1	3	2	12	1
Secretary, Clerk	1	2	1	1	1	1	1	1	1	*	0	*	1	1
Professsions & Sciences	9	4	24	12	14	18	6	6	19	15	0	56	3	9
Allied Health	2	1	1	*	1	2	0	*	13	1	0	*	1	6
Engineer	0	0	1	0	0	0	*	0	*	2	0	56	1	1
Natural Scientist	0	0	0	*	0	*	0	1	6	12	0	0	*	0
Social Scientist	0	0	*	2	*	2	1	*	0	0	0	*	0	0
Other (Artist, Clergy, etc.)	7	3	22	10	13	14	5	5	0	*	0	0	1	2
Teaching	28	53	19	3	9	10	32	11	26	27	83	1	4	33
Elementary, Secondary	27	53	17	2	7	10	32	10	25	24	83	1	3	31
College	1	0	2	1	2	*	*	1	1	3	0	*	1	2
Trades	18	10	13	10	9	11	12	12	11	7	2	5	7	7
Other (Military, Farmer, etc.)	30	19	31	40	32	42	26	49	29	27	12	28	25	35

SOURCE: Ann Stouffer Bisconti, College Graduates and Their Employers -- A National Study of Career Plans and Their Outcomes. Bethlehem: The CPC Foundation, Report #4, 1075, p. 11.

TABLE III - 7

DISTRIBUTION OF OCCUPATIONS BY UNDERGRADUATE MAJOR (%): WOMEN - 1966 COHORT

Occupations in 1971	Arts & Humanities			Social Sciences					Biological Sciences	Physical Sciences	Education	Engineering	Business	Other
	English	Languages	Other	Economics	Sociology	Psychology	History	Other						
Business-Related	25	23	21	44	20	21	19	40	16	39	5	15	66	6
Accountant	*	*	1	9	*	0	1	1	0	4	*	0	17	0
Administrative Assistant	6	4	3	19	8	3	4	14	9	6	1	0	6	1
Business Administrator	2	1	1	2	*	*	3	2	0	1	*	0	5	1
Computer Personnel	*	*	*	4	*	*	*	*	1	20	*	15	2	*
Sales	*	1	2	1	1	6	*	1	2	*	*	0	5	1
Secretary Clerk	17	17	14	9	11	12	11	22	4	8	4	0	31	3
Professions & Sciences	6	3	9	11	25	24	11	18	28	9	1	0	1	47
Allied Health	*	*	1	0	*	3	0	1	10	1	*	0	0	46
Engineer	0	0	0	2	0	0	0	0	0	1	0	0	0	0
Natural Scientist	*	1	0	0	0	0	*	1	9	5	*	0	0	0
Social Scientist	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Other (Artist, Clergy, etc.)	6	2	8	9	25	20	11	16	1	2	1	0		1
Teaching	50	52	39	20	24	35	41	19	38	42	87	73	24	33
Elementary, Secondary	49	50	39	20	24	35	41	19	38	41	87	73	23	31
College	1	2	0	0	*	0	0	0	*	1	*	0	1	2
Trades	2	3	2	2	2	3	2	5	8	2	1	0	1	1
Other (Military, Farmer, etc.)	18	20	30	24	29	17	28	20	9	10	5	12	9	11

SOURCE: Ann Stouffer Bisconti: College Graduates and Their Employers--A National Study of Career Plans and Their Outcomes. Bethlehem: The CPC Foundation, Report #4, 1975, p. 11.

TABLE III - 8

DISTRIBUTION OF EMPLOYERS, TOTAL AND BY SEX: 1961 AND 1966 COHORTS

	1961 Cohort			1966 Cohort		
Employer in 1971	Total	Men	Women	Total	Men	Women
Private Companies	29	35	16	27	38	18
Manufacturing & Mining	11	14	4	5	9	1
Retail & Wholesale	4	5	3	7	10	5
Other Private Companies	14	16	9	15	19	12
Self-Employed	7	9	4	3	4	2
Education	35	26	54	37	21	55
Government	11	12	11	11	12	11
Nonprofit	6	5	10	7	4	11
Other	11	13	6	14	22	5

SOURCE: Ann Stouffer Bisconti, College Graduates and Their Employers—A National Study of Career Plans and Their Outcomes. Bethlehem: The CPC Foundation, Report #4, 1975, p. 11.

SALARIES

It was suggested at the outset of this chapter that narrow specialization, to be effective, would have to result in a higher probability of obtaining employment or higher salary levels. Table III-9 gives salary data for men and women in the entire 1961 age cohort and for that sub-sector who were employed as business administrators--a major occupational choice of all undergraduates regardless of degree. Here it would appear that high specialization does result in some monetary benefits to the graduate, with business and engineering graduates receiving the highest salaries--followed closely by economics and other social sciences. Among those graduates working as business administrators, however, the breakdown does not hold as well. All business administrators earn salaries above the average for their respective undergraduate majors and three-engineering, economics and sociology--earn higher salaries than business majors who are also business administrators. None of the graduates holding non-business who were business administrators earn less than 13 percent below business graduates in the same occupation.

In all occupations women earn less than men, except female engineers and female business graduates who become business administrators. This is consistent with the earlier findings that women tend to receive lower entry level jobs in almost all occupations. Salary discrimination against women has always been evident, but these differentials were narrowing prior to 1971.[33] Since that time they have widened somewhat as larger numbers of females have entered the labor market and their labor force participation has become less transitory in nature.[34] Analysis of the salary date for the 1966 cohort (not shown) shows much the same patterns in relative salaries, although absolute salary levels were somewhat lower owing to the shorter labor force experience of this group.

---

[33] Economic discrimination against women and the results of the large number of studies done on the subject are discussed in The Economic Report of the President, Washington, D.C.: U.S. Government Printing Office, 1973, Chapter IV.

TABLE III - 9

MEDIAN SALARIES, BY UNDERGRADUATE MAJOR FOR ALL 1961 COHORT GRADUATES AND FOR BUSINESS ADMINISTRATORS, BY SEX

UNDERGRADUATE MAJOR	ALL GRADUATES		BUSINESS ADMINISTRATORS	
	MEN	WOMEN	MEN	WOMEN
English	$10,301	$ 9,002	$12,514	$11,096
Languages	9,738	9,300	12,514	11,906
Other Arts & Human.	10,588	8,443	12,514	11,906
Economics	13,285	12,799	18,580	n.a.
Sociology	9,166	7,183	15,082	n.a.
Psychology	11,893	9,556	13,239	n.a.
History	11,401	8,251	13,085	n.a.
Other Social Sciences	12,084	9,655	13,276	n.a.
Biological Sciences	10,330	9,309	13,086	n.a.
Physical Sciences	11,996	11,704	13,086	n.a.
Education	10,653	8,616	n.a.	n.a.
Engineering	14,535	15,127	17,343	n.a.
Business	13,471	10,461	14,387	18,413
Other	11,212	9,304	n.a.	n.a.

n.a.: Not Available
Source: See Table III - 8

---

[34] Econometric estimates of the permanent and transitory components of female labor force participation conclude that 75 percent of women employed are permanently attached to the labor force. See Darius J. Conger and John M. Campbell, Jr. "Population Dynamics," International Economic Review, forthcoming.

UNDEREMPLOYMENT

As shown above, educational major and occupational choice are tenuously related at best. This has led to a growing fear that college graduates, while employed in higher numbers than high school graduates, will increasingly be underemployed, resulting in frustration and alienation. Indeed, underemployment is a major factor behind predictions that future college age cohorts will have lower college participation rates than those of the 1960's and 1970's. The Chairman of the HEW Task Force on Work in America wrote:

> A portentous social pattern is beginning to emerge in many industrialized nations. In socialist and capitalist economies alike, increasing numbers of highly qualified workers are unable to find jobs that require their skills and training. Thus, a large and growing number of individuals are forced to take jobs that can be performed just as adequately by workers who have far lower levels of educational attainment.[35]

The welder or taxicab driver with a Ph.D. have become familiar examples of the inability of the economic and educational system to coordinate the educational training received in college with the educational training demanded by the economic system.[36]

If underemployment is a serious problem, this should be evidenced by high rates of job dissatisfaction. Yet Table III-10 suggests that a relatively high number of college graduates in both the 1961 and 1966 cohorts are satisfied with their present job. In general the 1966 cohort was slightly less satisfied, but they have had less time in the market to seek the second and third jobs which are more likely than entry-level jobs to meet expectations. Women are more likely than men to view their present employment as a good job within the 1961 cohort, but the reverse is true among the 1966 cohort, which had lower rates of job satisfaction in all categories. These conclusions are borne out by differential in the number of individuals wanting to remain on their present job between cohorts.

---

[35] James O'Toole, "The Reserve Army of the Underemployed: I - The World of Work," Change: The Magazine of Higher Education, Vol. 7, #4. 1975, p. 26.

[36] Indeed, these are the specific examples cited in Richard A. Shaffer, "Down The Ladder," The Wall Street Journal, January 1, 1976, p. 1 and p. 8.

TABLE III - 10

JOB SATISFACTION, BY SEX AND UNDERGRADUATE MAJOR (%) 1961 AND 1966 COHORTS

	PRESENT JOB GOOD ONE				WANT TO REMAIN ON PRESENT JOB			
	1961 COHORT		1966 COHORT		1961 COHORT		1966 COHORT	
UNDERGRADUATE MAJOR	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN	MEN	WOMEN
Arts & Humanities								
English	75	86	65	64	59	67	44	49
Languages	88	86	79	72	62	72	48	56
Other	81	67	65	65	68	56	43	48
Social Sciences								
Economics	90	89	69	60	65	65	36	45
Sociology	83	80	61	72	69	53	36	48
Psychology	68	80	55	70	71	54	34	57
History	79	69	58	67	66	56	41	54
Other	88	72	58	63	69	49	40	44
Biological Sciences	65	70	66	66	58	59	44	52
Physical Sciences	87	88	62	69	60	61	50	59
Education	91	92	81	83	64	73	68	71
Engineering	89	79	70	*	65	55	48	*
Business	86	77	63	69	71	58	52	59
Other	87	85	69	81	82	55	54	63

SOURCE: Ann Stouffer Bisconti, College Graduates and Their Employers - A National Study of Career Plans and Their Outcomes. Bethlehem: The CPC Foundation, Report #4, 1975, p. 11.

Job satisfaction or dissatisfaction can encompass more than underemployment, however. Breaking the 1961 cohort into those employed in occupations remote and related to their undergraduate majors, Table III-11 illustrates differences between occupation and long run career goals. As one would suspect, those taking jobs remote from their undergraduate major were more likely to feel the job did not fit their long run career goals. Among men and women taking jobs in areas related to their major, there was little difference in goal fits. Women, however, were less likely than men to feel their job fit long-range goals than men. what is surprising about a comparison between Tables III-10 and III-11 is the apparent lack of correlation between those viewing their jobs as good ones, those wishing to remain on their present job, and those viewing their jobs as consistent with long-range goals. For example, among arts and sciences undergraduate majors, 79 percent felt their job to be a good one and 78 percent felt the job to be consistent with long run goals. Yet only 64 percent wished to remain at their present job.[37]

TABLE III - 11

CURRENT (1971) JOB FITS LONG-RANGE GOALS: BY UNDERGRADUATE MAJOR AND SEX

	Men		Women	
Undergraduate Major	Related Jobs	Remote Jobs	Related Jobs	Remote Jobs
Arts & Humanities	93	63	88	45
Social Sciences	84	61	82	64
Biological Sciences	76	55	85	67
Chemistry	81	79	92	86
Other Physical Sciences	64	60	80	43
Engineering	78	85	72	67
Business	88	73	71	48

SOURCE: See Table III - 8

---

[37] Bisconti and Gomberg, The Hard-To-Place Majority, pp. 21-23.

What these data appear to show is that vocationalism does decrease the length of time needed to find a job, lower the probability of unemployment, and increase the salary received by small amounts. However, narrow specialization does not appear to produce significantly greater job satisfaction. This may be due to the large numbers entering the teaching profession which is felt to contain relatively more non-pecuniary consumption benefits (flexible hours, summers off, etc) than other occupations. As the number of new teaching opportunities decline, job satisfaction may decline and underemployment increase. An encouraging note in the above data is that business and service occupations employ large numbers of graduates from all specializations and that, on balance, the probability of success (viewed from the standpoint of salary received and perceived job satisfaction) bears little relationship to the choice of undergraduate major.

In part these data confirm the results of recent studies which show that, beyond high school, ability rather than education is a more significant determinant of earnings.[38] To the extent that a college degree does, in some broad sense, screen out those with above average ability regardless of undergraduate major, one would not expect significant salary differentials between majors entering a given occupational category. Job satisfaction, however, may be related to a much greater extent to the reasons why individuals pick certain educational majors and careers. Engineers, for example, pick "intrinsic interest in the field" and "originality" as the primary reasons for having chosen their major. Social scientists, on the other hand, opted for their disciplines because of "autonomy" and "contribution to society" while those in business-related majors picked those fields primarily because of "high earnings" and "rapid career advancement."[39]

---

[38] A review of this literature can be found in Zvi Griliches and William M. Mason "Education, Income,and Ability", Journal of Political Economy, Vol. 80, #3, Part II (May/June, 1972) pp. S575-S103 Griliches and Mason also disagree with this conclusion.

EXOGENOUS FACTORS: ON-THE-JOB TRAINING

Business, industry and government operate large independent educational establishments at an annual cost of several billions of dollars. These training centers employ several thousand individuals and train many thousands more.[40] Primarily these educational efforts are directed to six objectives:[41]

1. To introduce new employees or newly appointed managers to the organization, style and objectives of an employing entity;
2. To incorporate and diffuse rapid technical change, especially in engineering and scientific fields;
3. To sustain professional vitality, ensure professional growth and to foster career path flexibility;
4. To avoid the cost of travel and release time for training at outside institutions;
5. To exploit the increased motivation of on-the-job training which allows newly acquired skills to be immediately practiced;
6. To fulfill legal and social responsibilities to expand employment and advancement opportunities for minorities and the disadvantaged.

---

[39] A.S. Bisconti, *College Graduates and Their Employers: A National Study of Career Plans and Their Outcomes*, Bethlehem, Pa.: The CPC Foundation, Report #4, 1975, pp. 18-20.

[40] Patrick E. McCarthy, "Higher Education: Expansion Without Growth," *Daedalus*, Winter, 1975, p. 84.

[41] Lewis M. Branscomb and Paul C. Gilmore, "Education in Private Industry," *Daedalus*, Winter, 1975, p. 226.

Of these six, higher education will not be able to contribute in any meaningful way to number one. The remaining categories, however, can be thought of as areas which have traditionally been in the domain of the University. They have been partially substituted for in the private sector either because delivery systems have failed to address the requirements of this sector (especially number four in relation to all the others) or the higher educational system has itself become more specialized (junior colleges are more likely to be engaged in the type of education implicit in numbers five and six).

But for whatever the reason, to the extent that on-the-job training can be successfully substituted for the education received at a traditional university, both higher education and students may suffer. Higher education suffers because it loses potential demanders for its services. If successful in certain limited objectives (specific skill acquisition, refresher courses, etc.), the private sector may be encouraged to increase the domain of this substitution. It is certainly consistent with the post-selection process for graduate education mentioned in Chapter II. It is also consistent with increasing trend of employers to hire directly from their own co-op programs.[42]

On-the-job training is also inimical to the interests of students in general. Such training tends to be organization-specific, thereby retarding "the general job interchangeability benefits that permit graduates to seek cross-industrial employment enjoyed by graduates of institutions that grant degrees."[43] Educated manpower is perhaps the last scarce commodity that the private sector has not yet been able to generate internally, i.e., relatively little land is used in modern, industrialized societies, financial capital is available through the retained earnings of large corporations, both Madison Avenue and the federal government are committed to sustaining a high demand for goods and services, and multinational enterprises can command physical resources from around the world. Thus markets, natural resources and finances are relatively easy to command. Only talented manpower remains outside the purview of the private sector, which must accept the quantity and assortment of graduates each year without having any real control over either.[44]

---

[42] The College Placement Council, Inc. Four-Year Liberal Arts Graduates, Bethlehem, Pa.: The CPC Foundation, 1975, p. 3.

[43] McCarthy, "Higher Education," p. 84.

---

[44] This thesis is entertainingly developed by J.K. Galbraith, The New Industrial State, Boston: Houghton-Mifflin Company, 1971. Despite his lack of rigor, I believe his general thesis to be correct.

SUMMARY

1. Vocationalism--specific training for specific occupational categories--is more pronounced among both students and employers in the last few years than has historically been the case.

2. It is difficult to perceive significant benefits accruing to students who are narrowly trained according to the expected correlations between undergraduate majors, occupational choice, salary, and job satisfaction.

3. Both unemployment and underemployed are encountered more frequently by more recent university graduates, but differences in both by undergraduate major suggest this may be more a function of adverse economic effects than surpluses in college-trained manpower. The declining numbers of new teaching opportunities, however, will put additional pressure on other occupational choices and future unemployment and underemployment rates may be slightly higher than those of the 1950's and 1960's.

4. On-the-job training by the private sector may increasingly be substituted for formal academic training unless steps are taken to address the special needs of the private sector (about which more in Chapter IV).

CHAPTER IV
TRENDS IN THE FUTURE

We come, somewhat timidly, to a view of the future. Much of what the future holds in store for higher education depends on the state of the national economy, either directly via tax revenues recycled back to higher education or indirectly by creating a demand for the output of higher education--a skilled labor force. Despite the spate of doomsday literature such as the Club of Rome - MIT works and the recent natural resources shortages, most economic observers expect the growth of economic activity to continue at or near its long-term trend of two to three percent per annum.[45] If fertility rates continue to remain at or near their current low levels, the last quarter of this century will continue to witness ever-higher standards of living for the nation.

In analysing trends affecting higher education during this century, one which stands out is the increasing demand by the population to share in the social dividends possible in an advanced economy. This egalitarianism is less evident in the distribution of earned income than it is in the distribution of transfer payments, subsidies, and in-kind benefits through government agencies.[46] Hardly surprising, then, is the educational widening described in Chapter II which has occurred and which will continue to occur.[47] More difficult to anticipate is the type and distribution of college educated manpower which will be demanded by the economy (See, however, Chapter V and Appendix A). Given the ability of past college graduates to secure employment regardless of undergraduate training, the type of college graduate rather than the undergraduate major distribution will be the major focus of this chapter.

---

[45] The literature referred to is Donella H.Meadows, Dennis L. Meadows, Jorgen Randers and William W. Behrens III, The Limits to Growth, Bergenfield, New Jersey: Signet Paperback, 1975. A more balanced view may be found in Mihaijlo Mesarovic and Eduard Pestel, Mankind at the Turning Point, Bergenfield, N.J.: Signet Paperback, 1974.

[46] An excellent discussion of this process and its results may b found in David Culp, "Welfare Reform: The Negative Income Tax," Unpublished Master's thesis, Central Michigan University, 1976, Department of Economics.

INSTITUTIONALIZATION AND DIFFUSION OF KNOWLEDGE

The methods of acquiring and disseminating knowledge have undergone substantial change during the twentieth century. Advances in knowledge previously had come primarily from the isolated researcher pursuing an individual research goal or from "big push" research efforts which had narrowly defined objectives. Dissemination of new discoveries took place via informal scientific channels and professional journals. Innovation, or practical applications of new knowledge, were generally many years removed from the date of discovery.

What has replaced this somewhat random process of scientific discovery is a new form of industry--the knowledge-based industry. This new industry has as its primary goals the expansion of knowledge and the transformation of that knowledge into innovations. One effect of this systematization has been to reduce the time span between the initial discovery of a new process and an awareness of its commercial potential from thirty to nine years and to reduce the time between awareness of commercial potential to economically viable product from seven to five years.

---

[47] W. Allen Wallis, "Unity in the University," Daedalus, Winter, 1975, p. 52.

The knowledge-based industry, with its shortened lead time between discovery and commercial application, when coupled with the ability of the computer to store, retrieve, and analyze millions of bits of information, suggests that college trained manpower will be working in one of five broadly defined areas in the future.[49] First, for large numbers of the hard science graduates (engineering, physics, chemistry, mathematics, geology and biological sciences), the primary thrust of their efforts will be to systematically expand the frontier of knowledge. Employment will come from the educational sector, the science-based industries, and government. Second, in the same employment sectors, the remainder of the hard science graduates and some portion of the business graduates will be engaged in exploring the commercial and social possibilities of new discoveries and the market and distribution potential of these possibilities. Third, the remainder of business graduates and many of the social science graduates will be engaged in the management and service sectors responsible for the production and distribution of goods and services in the economy. This group will find employment primarily in government at all levels, business, industry, and self-employment in service-based and management-based establishments.

Fourth, a substantial portion of the social science and liberal arts graduates will be employed in leisure time and personnel industries. The highly technocratic economy will put increasing demands on meaningful usage of leisure time and on inter-personal relationships. The management of people rather than goods will be the limiting factor in expansion of economic and social well-being. Finally, all educational groups will be employed in modeling the effects of technological change. The emphasis on knowledge expansion as an induced sector, the ability of the computer, the sophistication of forecasting techniques, and the potential for deleterious side effects from new discoveries (political, social or economic), seem to make the systematic introduction of innovation both possible and necessary. This is both a natural adjunct to the rationalization which has taken place in the discovery of new knowledge and a logical defensive reaction to the potential negative side effects that new knowledge can produce.

---

[49] I am referring specifically to new or expanding areas of employment. The agriculture, mining, manufacturing and construction sectors will continue to employ large numbers of university graduates, but this demand will come primarily from replacement and not growth.

EXPANSION IN KNOWLEDGE AND MANAGEMENT-SERVICE SECTORS

Underinvestment in People

The rise in science-based industries in the United States has not been without its costs. Official government figures shown in Table IV-1 indicate half of all Research and Development funds are allocated to the space and defense sectors. If nuclear research is included as having potential military application, the percentages devoted to defense and space rise to nearly eighty percent. Unquestionably there have been beneficial civilian side-effects from such research, but non-defense research has definitely been a secondary consideration. As a result, a large number of outstanding problems in the civilian sector have remained unresolved. The familiar litany of the cities, unequal access to health care, ecology and environment generally head the list. Although defense expenditures have historically been regarded as sacrosanct, they have recently been subject to closer scrutiny. And one does not have to be an advocate of detente to question whether our principal competitor, the USSR can continue to match the U.S. ruble for dollar in defense spending. The Russian economy and manpower situation appear to preclude this for the indefinite future.[50]

TABLE IV - 1

RESEARCH AND DEVELOPMENT EXPENDITURES IN THE UNITED STATES, 1955-1975

	Research and Development Outlays			As Percent of Total Research and Development					
				Defense-Space Related			Other Outlays		
Year	Total (Millions)	Defense-Space Related	Other	Total	Defense	Space	Total	Non-Federal	Federal
1955	6,182	3,039	3,143	49.2	48.2	1.0	50.8	43.2	7.6
1960	13,551	7,509	6,042	55.4	52.2	3.2	44.6	35.4	9.2
1965	20,091	10,765	9,326	53.6	32.9	20.7	46.4	35.1	11.3
1970	26,047	11,235	14,812	43.1	32.8	10.3	56.9	43.3	13.6
1975	34,345	12,340	22,005	36.0	27.7	8.3	64.0	46.9	17.1

SOURCE: Statistical Abstract of the United States, Washington, D.C.: U.S. Government Printing Office, 1975, p. 546.

The employment of engineers and scientists by sector over the post-war period is given in Table IV-2. It would seem probable that the functional distribution of scientists who are shown in Table IV-3 by occupation, would follow a pattern similar to that of R&D expenditures. If so, our nearest industrial competitors, Western Europe, have nearly a third more scientific personnel engaged in civilian R & D than the U.S.[51] Given the confluence of long unresolved civilian sector problems and the potential for reducing defense expenditures, both the absolute amount of real R & D monies and the percentage distributed to civilian research should increase during the last quarter of this century. To this end, the growth in government scientists engaged in social sciences, urban planning and psychology since 1960 has been more rapid than the growth of all government scientists.

---

[50] I am not at all implying that defense expenditures will decline, merely that they will decrease as a percentage of total expenditures on R & D. The logic behind this paragraph is explored in some detail in Darius J. Conger and Giorgio Canarella, "Efficiency and Production in Soviet Industry," L'Est, Vol. 3, No. 4, (December, 1974), pp. 41-67 and Murray Feshbach and Stephen Rapaway, "Labor Constraints in the Five-Year Plan," Societ Economic Prospects for the Seventies, Washington, D.C.: U.S. Government Printing Office, 1973, pp. 485-564.

TABLE IV - 2

EMPLOYMENT (000'S AND PERCENTAGES) OF NATURAL SCIENTISTS ENGAGED IN RESEARCH AND DEVELOPMENT, BY EMPLOYING SECTOR: 1950 - 1970

Sector (000's)	1950	1955	1960	1966	1970
Industry	102.6	180.4	282.1	369.9	372.2
Federal Government	27.4	27.6	44.7	72.3	69.6
State & Local Government	1.9	2.3	3.4	4.5	4.2
Universities & Colleges	22.9	33.8	48.6	65.6	75.7
Nonprofit Organizations	3.1	4.7	7.3	14.0	13.7
Sector (%)	1950	1955	1960	1966	1970
Industry	64.98	72.51	73.06	70.28	69.52
Federal Government	17.35	11.09	11.58	13.74	13.00
State & Local Government	1.20	0.92	0.88	0.86	0.78
Universities & Colleges	14.50	13.59	12.59	12.46	14.14
Nonprofit Organizations	9.96	1.89	1.89	2.66	2.56

SOURCE: Statistical Abstracts of the United States, Washington, D.C.: U.S. Government Printing Office, 1975, p. 546.

---

[51] Daniel Bell, The Coming of Post-Industrial Society, New York: Basic Books, Inc., Publishers, 1973, p. 261.

TABLE IV - 3

PROFESSIONAL SCIENTIFIC AND TECHNICAL PERSONNEL (000'S) IN THE FEDERAL GOVERNMENT, BY OCCUPATIONAL GROUP: 1960 - 1973

Occupational Group	1960		1973	
	Number	Percent	Number	Percent
Scientific Personnel	53.3	34.75	77.2	36.23
Physical Sciences	18.0	11.73	26.4	12.39
Math. & Statistics	3.0	3.26	9.5	4.46
Biological Sciences	21.6	14.08	28.2	13.23
Geography & Cartography	2.3	1.50	2.9	1.36
Psychology	1.7	1.11	2.5	1.17
Engineering Personnel	61.0	39.77	84.3	39.56
Health Professional Personnel	39.1	25.49	51.6	24.21
Total	153.4	100.00	213.1	100.00

SOURCE: Statistical Abstract of the United States, Washington, D.C.: U.S. Government Printing Office, 1975, p. 546.

The Management-Service Sector

The spending patterns of individuals and households, both over time and across countries and income levels, support the contention that civilian research expenditures will increase with the increasing affluence of the population. Increasing affluence brings first a reduction in the proportion of income spent on food and an increase in the proportion spent on consumer durables. In time, the proportion spent on durables too begins to level off and decline and the proportion spent on services (recreation, luxury items, quality life styles, etc.) begins to rise. U.S. consumers have already reached the third stage judging from the percentages shown in Table IV-4. Expenditures on food, clothing, and housing operations (largely consumer durables purchases) have declined since 1950, while those for personal care, medical care, transportation, recreation and housing have risen. These trends for the U.S. are confirmed by longer historical studies of the U.S. and other countries passing through similar stages of development.[52]

TABLE IV - 4

PERSONAL CONSUMPTION EXPENDITURES, BY PRODUCT: 1950 - 1973

Product	1950	1955	1960	1965	1970	1973
Food, Beverages, Tobacco	30.5	28.4	26.9	24.8	22.9	22.2
Clothing, Accessories, Jewelry	12.4	11.0	10.2	10.0	10.2	10.1
Personal Care	1.3	1.4	1.6	1.8	1.7	1.5
Housing	11.1	13.3	14.2	14.7	14.7	14.5
Housing Operations	15.4	14.7	14.4	14.3	14.2	14.6
Medical Care Expenses	4.6	5.0	5.9	6.5	7.7	7.8
Personal Business	3.6	3.9	4.6	5.1	5.7	5.6
Transportation	12.9	14.0	13.3	13.5	12.6	13.6
Recreation	5.8	5.5	5.6	6.1	6.6	6.5
Other	2.4	2.8	3.3	3.5	3.9	3.6

SOURCE: Statistical Abstract of the United States, 1975, p. 383.

---

[52] See especially H.S. Houthakker, "An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law," _Econometrica_, Vol. 25 (October, 1957), pp. 532-51.

It is tempting to ascribe a puckish role for inflation in all of these figures, especially since inflation is most predominate over the long term in medical care and the current food and energy inflation portends some increases in percentages expended on food and housing operations. But demographic influences and the normal tendency to substitute lower for higher priced commodities can be expected to offset current (and highly unusual) price increases. Due to the pass through of postwar babies and declining fertility rates, households in the next quarter of a century will be, on the average, older and smaller.

Especially pronounced will be the decline in the rate of new household formation and it is from this group that high (as a percentage of income) expenditures on food, clothing and household operations come. The majority of households will consist of those at or near their peak earnings periods and these earnings will be high owing to the large proportion of college educated individuals comprising these households. Increasing medical care expenditures follow naturally from this. Higher education is associated with higher earnings and hence the opportunity cost of ill health is greater the higher the earnings. Medical expenditures are another type of defensive expenditure designed to protect one's lifetime earnings potential.

The Leisure Industry

The leisure industry deserves special attention for two reasons: first, in the future this industry will involve considerably more than travel and recreational vehicles; second, the amount of leisure time is expected to increase substantially. Taking the latter first, the number of hours worked per week have declined by about 25 percent since the turn of the century. This has been possible because reductions in hours worked were more than offset by increases in labor productivity. But the reduction in hours worked has come primarily from a decrease in the working day, so that after allowing for technological advance and increases in capital per worker (both physical and human), productivity per man-hour has been inversely related to the number of hours worked per day.[53] It seems impractical to assume that reductions in the work day will be as pronounced as they have been historically. However, reductions in total hours worked, via both a shorter work week and an increasing number of days off per year seems both possible and probable.[54]

This change in the type of time potentially available for leisure activity will also alter the type of leisure demanded by individuals. Insofar as this will affect higher education, shorter workweeks and possibly more flexible working arrangements will lower the costs of attending a college or university. The three groups of non-traditional students identified in Chapter II will increasingly have the opportunity to utilize their leisure time pursuing educational objectives or avocations acquired while attending college. Students should be encouraged to develop such avocations while in residence. A life-time sport, bird watching, music, theatre-going, tracing family and local history, home production (making one's own furniture, etc.) require skills which can be as much a part of the higher educational experience as learning FORTRAN or cross partial derivatives. A second major impact on higher education will be the number of new jobs in the leisure industry requiring college-trained personnel.

---

[53] This phenomenon has been observed for all industrialized countries and is extensively documented in Edward F. Dennison, Why Growth Rates Differ, Washington, D.C.: The Brookings Institution, 1967, pp. 54-78.

[54] Witness the current bargaining position of the United Auto Workers, traditionally trendsetters in negotiating labor contracts.

People Management

What distinguishes management-services industries from the agriculture, mining, manufacturing and construction industries historically employing the bulk of the labor force is the necessity to organize and manage people rather than goods. Automation, coupled with computer technology, will make the logistics of production and distribution increasingly routinized. Employment will thereby decline as a percent of the total labor force and perhaps, as is already the case with agriculture and mining, absolutely as well. In areas where technically possible, the economic system will continue the long extant trend of substituting capital for labor.

Management-service industries, on the other hand, are by their very nature labor intensive. They involve relatively fixed amounts of labor input per unit of service rendered. Technological change works to increase the quality of the service provided but does not significantly reduce the labor time necessary. Computer data tapes with hourly stock market transactions and sophisticated econometric price-earnings models may greatly improve an investment counselor's advice, but the number of clients one counselor can be responsible for will remain relatively constant.

Two factors tend to limit reductions in labor input per unit of service: time and ability of an individual to absorb information.[55] The consumption of services, among other costs, takes time--two hours to see a movie, thirty minutes for a TM session, fifteen minutes with a broker, etc. As incomes rise, the income ability to consume in leisure activities or produce (via productivity increases) rises, but less quickly than the time available to spend in this consumption or production. Management-service establishments are an economically rational way of optimizing leisure time. It is less time costly to have an investment counselor than to carefully read and analyze the market transactions daily, for example. But the time saved can be used in other activities more highly valued. Likewise, it is more economical to employ a consulting firm, than to put one's own people in certain tasks.

An individual's ability to meaningfully assimilate and act on information suggests that the management-service production worker ratio will inevitably rise. The surfeit of information possible will push management decisions further and further from the top echelons. Yet top management will still be responsible for coordinating this decision process. Optimal decision making will be increasingly devoted to optimal human, rather than physical, resource management.

---

[55] Time is of course the ultimate scarce commodity. For an engaging look at how scarcity of time affects decision-making see Gary S. Becker, "A Theory of the Allocation of Time," Economic Journal, Vol. 75, September 1965, pp. 493-517.

Cross-Fertilization: Interdisciplinary Studies

The importance of the management-service sector, the increase in the sheer volume of information available and the rising time costs associated with all activities will lead to a broader based undergraduate curriculum. The volume of new information suggests an accelerating trend toward sub-specialization by discipline. Physics, for example, listed twelve fields and 154 specializations in 1968 as compared with ten specializations and 74 specializations in 1954, an addition of slightly over four new specialties per year. For all sciences listed in the National Register of Scientific and Technical Personnel, the number of specialties within disciplines grew to 900 from 54 over the same period.[56] A physicist, economist, or historian will cease to be a meaningful descriptive title, since no undergraduate (or graduate) will be able to keep up with all sub-specialties within his or her discipline. Undergraduate education will therefore focus largely on the theoretical underpinnings of disciplines; graduate work will be devoted to mastering of a narrow specialty.

Both rising time costs and information volumes will require greater attention to optimizing models in all disciplines. Whatever the differences in objectives, inputs used, and type of outcome desired, disciplines use many of the same analytical techniques in employing optimizing models. Knowledge of computers, for example, will be imperative for all undergraduates lest they "find themselves cut off from many of the most important issues of their time or (are) reduced to relying on others to translate in diluted form the materials required to grapple effectively with these problems."[57] Mathematics, as a language enabling us to quantify intuition and make explicit the reasoning process, will be another of the basic tools with which undergraduates should be familiar. And the ability to communicate effectively, both verbally and in writing, will be one of two hallmarks for success in newly-minted undergraduates--the other being an ability to manage people as suggested above.

---

[56] Bell, Post-Industrial Society, p. 187.

The management-service sector, to the extent that it will be dealing with problems within the public domain (urban blight, crime, environment, social responsibility of businesses, etc.) will need individuals conversant in a wide variety of specific disciplines in order to effect solutions to these problems. Nevertheless, students will continue to major in specific disciplines rather than in interdisciplinary studies. What is imperative for the future is that students be encouraged to seek out interrelationships between disciplines, especially those which provide insights into the problems students may find themselves addressing during their working lives. I have no set formula available to accomplish this, but from my own discipline (economics) there are several possibilities of both a theoretical and applied nature. Theoretically, mechanics courses in physics provide the type of analytical tools necessary to handle disequilibrium models in economics, topology in mathematics is increasingly useful in dealing with economic sub-units (calculus is now so basic a tool that one considers it "part of the territory") and ecology courses offer the clearest methodology for tackling general equilibrium problems that I know of.[58]

---

[57] Derek Bok , "On the Purposes of Undergraduate Education," Daedalus, Fall, 1974, p. 165.

[58] I commit none of my colleagues, inside or outside my specialty, to this list or that in the following paragraph.

From an applications standpoint, no microeconomist should be without courses in accounting, management, marketing and finance; no macroeconomist's training is complete without political science and history, environmental economists must be acquainted with basic biology and geology, and those economists entering the public policy area will need a knowledge of the arts, literature, applied arts and education, depending the public sector they enter. It has been suggested that this approach is primarily one of greater competence in advisement. Certainly better advisement is necessary, but what is envisioned by the type of interdisciplinary program suggested above is an undergraduate preparatory program which will not only make the resulting graduates more widely employable but allow them to advance within a chosen profession by achieving the flexibility necessary to change as job demands and professional interests change.

Cross Fertilization: The Outside World

The weak correspondence between undergraduate major and eventual occupational classification suggests not only the occupational mobility provided by a college degree, but uncertainty on the part of the students as to exactly what their lifetime occupation might or ought to be. Partly, no doubt, this stems from the changes in values which the college experience generates. But it is also partly due to the inability of the higher educational establishment to provide its clientele with more than a glimpse of what their future working life will be like. Education departments, which have extensive student teaching and training programs, come closest to providing this type of experience and the closer correspondence between major, occupation, and high job satisfaction ratings for educators may reflect this. Although it provides only an educational minor at Central, ROTC also provides those contemplating a career in military service with a realistic view of what can be expected.

We would do our students a great service by strengthening existing ties and developing new ones "on the outside." Such ties, by providing additional information and experience to students, will make career choice more intelligent and offer the possibility of increasing the employment prospects of our graduates. These contacts may also serve as an entry to one or more of the non-traditional student markets suggested earlier. There are several ways in which these ties may be developed or expanded. Already available are the services and expertise of the School of Continuing Education and Community Services and the Institute for Personal and Career Development. Co-operative programs now extant may point the way toward new areas in which similar programs may be established. Both of these existing vehicles have the advantage of having already written off the high start-up costs associated with such ventures and can be expanded at relatively low incremental costs. Second, they provide a different delivery system which lowers the student costs of acquiring additional education, either directly by going to the student or indirectly by providing part-time employment. A third possibility, also relatively low cost, is the establishment of umbrella research institutes such as the already proposed Bureau of Business and Economic Research, a Center for Community Service and Planning or the existing Center for Study and Research in Public Administration and Local Government.[59] These bring real world problems on campus and students should be encouraged to participate (as a part of their course work) in the resolution of these problems.

---

[59] The Center for Community Service and Planning is discussed in G. Jeffrey Barbour, Darius J. Conger and James R. Moor, Jr. "Bringing the Campus to the Community: A Talking Paper on Community Service and Planning." Unpublished manuscript, July, 1975.

Internationally, the United States has proven itself a leader in all facets of the knowledge industry. In addition to training thousands of foreign students annually the multinational scope of today's business enterprises and the international nature of contemporary problems suggests that the potential in this area is large indeed. Not only are U.S. students increasingly likely to find employment in a setting with some international intercourse, but foreign student enrollment in the U.S. is increasing. Foreign students at Central currently comprise less than one percent of the student body, but they are predominately graduate students and such students might increasingly support our graduate programs, especially in business and computer sciences. It is in computer technology, management science and engineering that the U.S. has the greatest international comparative advantage.

We are likely to increasingly export expertise, either directly via multinational business and consulting firms and government programs or indirectly via returning foriegn students rather than goods. The waning interest in learning (really learning!) a foreign language is therefore doubly regretable. First there is the loss of good will stemming from the failure to do others the courtesy of communicating in their own language. But deeper than this, "the essential hybris consists in thinking that American modes of thought, incorrected by any reference to the broader experience of mankind, are the only right and viable ones; for thought is mediated by language and he who knows no language but his own is unaware that there are any other patterns."[60]

---

[60] Gerald F. Else, "Some Ill-Tempered Reflections on the Present State of Higher Education in the United States," Daedalus, Fall, 1974, p. 141.

EXOGENOUS FACTORS: INFLATION

In spite of the earlier remarks on inflation, it will remain a serious problem in an economy whose growth sectors are the management-service sectors and whose labor force is predominately highly skilled. The reason for this seemingly paradoxical is that productivity increases in the service sectors are zero. This is not to say that there are no productivity increases occurring; rather, techniques for measuring them are so naive that this sector is arbitrarily defined to experience zero productivity increases. Because the sector is intensive, increases in labor costs translate directly into increases in the price of the service.

The immediate impact of continued inflation at the university level, especially when coupled with downward trends in enrollment patterns, is cutbacks in educational expenditures by the federal government and state legislatures. If so, the incremental effect on graduate programs may be severe. Table IV- illustrates the costs of undergraduate and graduate education in 1975. The significant difference between the two lies in the research support for the graduate program. The difference is important, for where undergraduate education produces an undergraduate degree as its final product, graduate education produces both graduates and finished research. In the past universities have been a cost-effective way of producing this research. But research results can be produced without graduate education by utilizing full-time research institutes and personnel in place of part-time research universities and students. If legislatures were to elect to have research done on a cost-effectiveness basis, continued inflation could result in the loss of cost advantage universities now have.[61]

A less immediate impact of inflation is the slowdown in the growth projections for the management-service sector. This would result in fewer jobs for college trained individuals and would make a reality of the projections of surpluses in college graduates. Whereas excess demand for college graduates pushed wages up, excess supply does not push wages down. The inevitable result of this would be a high incidence of unemployment among college graduates and the many adverse enrollment side effects which would emanate from this unemployment. In the long run, productivity measures will undoubtedly be developed for service sector jobs, but by then it may be too late if college participation rates begin to decline simultaneously with declines in the numbers of traditional college-age students.

TABLE IV - 5
COSTS OF GRADUATE AND UNDERGRADUATE TRAINING, 1975

	Inputs					
Student Type	Administration	Capital	Library	Teaching	Research	Total
Undergraduate	$544	$185	$216	$1,225	$0	$2,180
Graduate	$340	$440	0	$2,840	$12,500	$16,170

Source: Lawrence Southwick Jr. "Cost Trends in Land Grant Colleges and Universities," Applied Economics, Vol. 1, #3, pp. 178-79.

---

[61] An SCH model, of course, implies decreased funding for undergraduate education as well should enrollment decline, but the possibilities for introducing cost-effective technologyare greater at the undergraduate level. For some of these educational technologies see Herman Kahn and Anthony J. Wiener, Toward The Year 2000: A Framework for Speculation, NewYork: McMillan and Company, Inc., 1967.

SUMMARY

1. The signal characteristic of the last quarter of the twentieth century will be the expansion of the knowledge-based industry and the increasing number of college graduates employed in expanding the frontiers of knowledge, exploring and implementing the commercial and social potential of this knowledge, and in managing the informational and personnel problems attendent in such industries.

2. The U.S. has underinvested, both in human and monetary resources, in the civilian sector. The confluence of unresolved civilian sector problems and the potential for a social dividend auger well for increased R & D expenditures on such problems, both in absolute dollars and as a percent of total R & D spending.

3. Both demographic and economic trends presage increasing household budget expenditures for "quality of life" commodities, ranging from leisure activities to health care.

4. Undergraduate curricula will become more interdisciplinary in scope, reflecting both the difficulty in mastering a discipline at the undergraduate level and the need to retain career flexibility in a rapidly changing, knowledge-based economy.

5. The higher educational experience will cease to be an isolated interlude or an educational first circle between high school and the job experience. Increasingly, intercourse among the university, industry, government and local communities will be possible and mutually beneficial.

6. Persistent inflation, coupled with perceived (rather than actual) productivity stagnation in the knowledge sectors may lessen the employment possibilities of future university graduates and place many college programs, especially at the graduate level, in jeopardy.

CHAPTER V

PLANNING FOR THE FUTURE

The planning process at Central Michigan University effectively consists of making annual plans within a five-year planning cycle. This is a variant of Soviet economic planning which makes five-years plans with one year planning cycles. The distinction between the two is more than semantic, as Soviet plans have a five-year perspective in that the yearly cycle is based on goals set for achievement over five years. Planning at Central is more likely to have a one-year perspective, since the five-year goals can be revised annually.[62] Attention is thereby focused during the planning year on the immediately forthcoming planned year.

For allocating scarce resources, either plan will do a good job. Indeed, without explicit planning techniques and criteria, efficiency at all levels suffers. But the increased efficiency emanating from the planning process is not without certain costs. These costs, in both cases, stem from the reluctance of any individual planning sub-unit to take a long run viewpoint when all other sub-units are concentrating almost exclusively on budget allocations on the coming year. It is instructive that the Soviets are moving to fifteen-year plans. Recognition of these costs, I believe led to the commissioning of this study and this is the chapter in which talking points for the future are put forth. But first, a discussion of the job market for college graduates through the year 1985.

---

[62] I am referring primarily to the lowest echelon planning unit -- the Department. When resources are dwindling, those maintaining the status quo are "winners," but probably only in the shortrun. Perhaps in planning we should exhibit more of the elan of the U.N. Commander in Korea who, early in the hostilities, found himself surrounded by enemy troups. When asked by a junior officer what should be done, the commander said simply "Attack!"

THE LABOR MARKET FOR COLLEGE GRADUATES

The potential surplus of college graduates and the resulting underemployment have been discussed in earlier chapters. This section, however, is devoted to estimates of the number of new jobs available for college graduates, by discipline, through the year 1985. Most of the data used for the projection are presented in Appendix A. Projections of labor market conditions begin with estimates of how consumers will spend their future incomes (Table A-1). Next, estimates are made of the sectoral distribution of production and employment necessary to meet those consumer demands (Tables A-2 and A-3) and those industries expected to experience faster than average growth are identified (Tables A-4 through A-6). These are then broken down into occupational classifications, by education and rate of growth, in Table A-7.

To this point, the figures represent a demand for college-educated labor. Labor market conditions, especially salaries and unemployment rates, result from the interaction of both supply and demand. Table A-7 gives some idea of supply responses which can be expected, by undergraduate major, and the result is a projection of the annual openings plus an idea of how tight the market will be. The "winners" in this projection are presented in Table V-1 below, together with suggestions on areas of study outside the specific major enabling an undergraduate to enter the field and, where available, the percentage of males comprising the current (1974) labor force.

TABLE V - 1

OCCUPATIONS IN WHICH DEMAND IS EXPECTED TO EXCEED SUPPLY TO 1985.

Occupation	Annual Openings to 1985	Special Area of Study	% Male
Accountants	45,500	Data Processing	n.a.
Bank Officers	16,000	Data processing, Finance, Economics, Statistics, Commercial Law, all B & A	84
Credit Officials	4,500	All B & A, Economics, Liberal Arts	100
Hotel Managers	6,500		n.a.
Market Research Workers	3,000	English, Speech, Statistics, Psychology, Economics, Data Processing	100
Personnel Workers	23,000	Psychology, Engineering, Accounting	75
Computer Programmers	13,000	Natural Sciences, Math	75
Systems Analysts	9,100	Business Accounting	90
Actuaries	700	Statistics, Economics, B & A, Insurance Law, Accounting	n.a.
Police Officers	22,000	English, History, Political Science, Business Law, Phy. Ed., Sociology	100
State Police Officers	3,600	Same as Police Officers Data Processing good for both.	100
Government Health Inspectors	3,900		95
Soil Conservationists	n.a.		n.a.
Agricultural Engineers	550		98
Bio-medical Engineers	150		98
Ceramic Engineers	550		98
Civil Engineers	9,300		98
Industrial Engineers	n.a.		98
Electrical Engineers	12,200		98
Mechanical Engineers	7,900		98
Metallurgical Engineers	550		98
Geophysicists	450		n.a.
Chemists	6,400		90
Draftsmen	17,300		97
Engineering & Science Techn.	32,000		84
Surveyors	3,600		96
Dentists	5,200		98
Osteopathic Physicians	23,000		91
Physicians	23,000		92
Dental Hygienists	6,300		0
Dietitians	3,200		0
Medical Records Administrators	1,100	Data Processing, Science, B & A	0
Pharmacists	6,500		90
Respiratory Therapists	6,800		50
Sanitarians	1,000		100
Speech Pathologists & Audiol.	3,700	Primary M.A. level and above	75
Roman Catholic Priests	350		100
Psychologists	5,200	Primary M.A. level and above	75
Recreation Workers	5,900		50
Urban Planners	500	City Planning, Architecture, Engineering, Some B & A, Economics	90

At the outset it should be pointed out that these are the grossest kinds of estimates and they fail to take account of faster than average supply responses to good and bad market conditions, the potential for job upgrading and regional peculiarities in labor demand. Quicker than average supply response can make a good market mediocre or a poor market average in two or three years.[63] Job upgrading can also work in either direction, turning a good market sour by requiring increased credentialism and thereby eliminating undergraduates from the competition or create entirely new markets for college graduates not accounted for in the projections.[64] Schools putting the majority of their graduates in local economies or concentrate graduates in specific disciplines may be relatively unaffected by national markets. And it goes without saying that severe economic dislocation calls off all bets. Even barring any of these factors, these projections are most useful for students already in the pipeline, since they have the first chance to respond to either favorable or unfavorable market conditions.

Table V-1 is generally consistent with the trends suggested in earlier chapters. The knowledge sector (engineers, chemists, etc.) experience favorable market conditions as do many occupations in the management-service sector. All health occupations appear favorable as do certain quality of life occupations such as police work, recreation workers and urban planners. For almost all the management-service occupations data processing ability is rated a big plus, and it is already mandatory for these in the knowledge sector. Job opportunities for women, with few exceptions, are excellent.

---

[63] Credible manpower projections by specific occupations are possible but costly. For an example of one fitting both descriptions see James R. Moor, Jr. and John W. Mattila, Michigan Building & Construction Trades Craft Manpower Study, Detroit: Citizens Research Council of Michigan, 1974.

[64] Some of the implications of increased credentialism are discussed in Jacob Mincer, "Unemployment Effects of Minimum Wages," Journal of Political Economy, Vol. 84, #4, Part 2 (August, 1976) pp. S87 - S105.

Two things are evident from these figures. First, some occupations are so small that even though they are growing rapidly they are not significant employment creators in the near term. Second, a large number of occupations are missing. These, shown in Table V-2, are growing less rapidly than average or require specialties either not offered at Central Michigan University or not requiring an undergraduate degree. In both cases there are still many annual job openings, either from slow but positive growth or from replacement needs as workers retire or migrate to other industries.

TABLE V - 2

OCCUPATIONS IN WHICH SUPPLY IS EQUAL TO OR GREATER THAN DEMAND TO 1985.

Occupation	Annual Openings to 1985
Protestant Ministers	2,690
Rabbis	45
Range Managers	150
Employment Counselors	650
Rehabilitation Counselors	2,100
School Counselors	2,050
Aerospace Engineers	1,100
Chemical Engineers	1,850
Mining Engineers	350
Dental Assistants	14,500

(Table V - 2 Continued)

Occupation	Annual Openings to 1985
Dental Laboratory Assistants	2,600
Electrocardiographic Technicians	1,000
Electroencephalographic Technicians	350
Hospital Administrators	17,400
Licensed Practical Nurses	93,000
Medical Assistants	27,200
Medical Laboratory Workers	18,800
Occupational Therapists	1,000
Occupational Therapy Assistants	1,150
Optometrists	900
Optometric Assistants	1,800
Podiatrists	400
Physical Therapists	2,400
Physical Therapy Assistants	1,400
Veterinarians	1,450
Radiologic Technologists	8,600
Registered Nurses	71,000
Mathematicians	1,550
Statisticians	1,250
Geologists	1,300
Meteorologists	200
Oceanographers	100
Biochemists	800
Life Scientists	10,700
Astromers	30
Food Scientists	350
Physicists	1,700
Actors and Actresses	900
Dancers	950
Musicians and Music Teachers	5,200
Singers and Singing Teachers	2,400
Anthropologists	250
Economists	4,700
Geographers	650
Historians	1,300
Political Scientists	600
Sociologists	750
College and University Teachers	14,000
Kindergarten & Elem. School Teachers	94,000
Secondary School Teachers	37,500
Food Processing Technicians	75
Newspaper Reporters	2,200
Technical Writers	1,150
Air Traffic Controllers	750
Architects	3,000
Broadcast Technicians	230
College Career Planning & Placement Counselors	250

(Table V - 2 Continued)

Occupation	Annual Openings to 1985
Commercial Artists	4,000
Flight Engineers	190
Home Economists	9,000
Industrial Designers	450
Interior Designers & Decorators	1,550
Landscape Architects	900
Lawyers	26,400
Librarians	10,400
Photographers	3,400
Pilots and Copilots	2,800
Radio and Television Announcers	600
Social Workers	30,500
Underwriters	770
City Managers	n.a.
Claim Adjustors	6,600
Insurance Agents and Brokers	19,400
Real Estate Salesworkers & Brokers	28,500
Securities Salesworkers	6,100
Computer Operating Personnel	27,500
Advertising Workers	7,100
Buyers	9,000
Public Relations Workers	6,500
Purchasing Agents	11,700
Manufacturers' Salesworkers	9,500
Reservation, Ticket & Passenger Agents	4,250
Broadcast Technicians	1,350

The bulk of these new jobs fall into three categories. The medical professions, especially nursing and technicians, will annually require over a quarter of a million new people. While many of these occupations do not now require an undergraduate degree, the medical field is upgrading many jobs and in these future technical training is likely to give way to a degree as an entrance requirement. Education will continue to employ large numbers of graduates, although competition will be keen for jobs. Lastly, the management-service sector will employ the largest number of future graduates in a variety of occupations. It should be pointed out that these projections, especially for specific undergraduate majors, are for those actually working in their area--the economists *qua* economists, for example. Given the ability to secure employment in occupations somewhat removed from an undergraduate major shown earlier, these projections should not spell doom for any discipline. They do, however, make more imperative, the need to broaden the educational base of many disciplines, as the opportunity to move directly into a related occupation following graduation will be constrained.

INDICATIVE PLANNING AND FLEXIBILITY

Central Michigan University, no less than the corner grocery store and General Motors, is a business. It has production runs, inputs to transform into final products, a sales force, a board of directors and all the rest. Unlike a business, however, the university is not profit-oriented. A number of considerations make this distinction important. First, the university has no objective function to maximize, save the number of students it graduates. But numbers are a poor indicator, being as they are a diverse bundle of skill levels, employability and aspirations. Second, the university spends relatively small amounts of R & D monies on itself. The result is considerably less knowledge about our inputs, output, marketing channels, product lives, etc., than a successful business would deem prudent. Finally, the university finds itself unable to quickly move into and out of areas which are on the upswing or declining. Tenure, long lead times to train qualified personnel, and the inability to buy or sell off profitable or unprofitable subdivisions all combine to make the university a slowly evoluting entity.

Taken separately, these attributes of a university are good. Together they suggest, however, that universities are in the unenviable position of bearing certain types of market risks that many businesses seek consciously to avoid. In particular, most of the demand risk has been segregated into the 18-21 year-old market. This market is declining. Within this University, we are most widely known for a single product--new teachers. This market is declining. The University has not, in my opinion, taken full advantage of the potential for creating profit centers within its existing framework. These are programs that could be undertaken at relatively lower incremental costs because the fixed costs are already covered by existing state appropriations.

The first option the university faces, and it is not necessarily an unrealistic one, is to do nothing. The university can no doubt remain a viable institution by doing this, though it suggests an operation some two-thirds the size of the current one. A quality undergraduate program would result, and a graduate program could also be supported in education because of our excellent reputation in that discipline. But the loss of faculty would preclude many significant graduate programs outside education.

A second option, or really a series of options, is to create a new image for the university. If the reader has already elected the first option, then he or she need read no further, for the talking points presented below are primarily designed to stimulate thinking on new directions for higher education. They fall into five basic categories: (1) Students; (2) Curriculum; (3) Delivery Systems; (4) Placements; and (5) Grants.

NON-TRADITIONAL STUDENTS

(1a) The potential for Central Michigan University to capture a significant percentage of one or more of the non-traditional student markets mentioned earlier has yet to be fully explored. The available evidence suggests that this market is not insignificant.

(1b) The most likely markets to tap in the short run are the mid-life career switching market and the career upgrading market since programs are already extant for such individuals, especially at the graduate level. The channels developed will allow the exploration of other markets at relatively low cost.

(2a) The non-traditional student is likely to be more vocationally-minded than his or her 18-21 year-old counterpart. Programs and specific courses will be demand created (from the students or their employers) rather than supply created (what professors wish to teach).

(2b) These students are more apt to attribute responsibility for learning failures to the professor, resulting in more professional attention to teaching, though not necessarily less to academic research (see 3c).

(2c) Liberal education will be necessary for these students, but will have to be justified beyond a mere course requirement or a phrase "You need this. It is good for you."

(2d) In all disciplines, these students will be a pleasure to teach, partly because of their high motivation and partly because of the greater breadth of knowledge already possessed relative to traditional undergraduates. On the other hand, they will be frustrating as well. They will not genuflect at the titles "Doctor" or "Professor," they will have forgotten their high school algebra and may feel that agreement between subject and verb is splitting hairs.

(3a) In many cases these students will have neither the time nor the inclination to enroll as full-time resident students. The three-two-one delivery system (a three minute walk to class, two pieces of chalk and one eraser) will not be sufficient.

(3b) Serving this clientele will involve more programmed instruction, greater utilization of audio-visual aides, more off-campus teaching and more time-compressed courses. Ironically, these students may force the kinds of qualitative productivity increases long predicted for teaching which have in fact not yet been stimulated by captive markets in residence.

(3c) Such delivery systems involve high start-up costs in faculty time, but relatively low costs once implemented. This may well leave larger blocks of time for faculty to indulge their own research interests. Since research is more a function of the quality of time input rather than its quantity, research output may well increase.

(4) This group will have few placement problems since most are likely to be employed in full-time occupations while enrolled and have specific career goals and employment possibilities already in hand.

TRADITIONAL STUDENTS

(1) Central Michigan University's objective regarding traditional students should be to increase our share of enrollments within this group. Attracting them in larger (relative to other schools) numbers will involve two considerations: continuing to offer quality programs and maintaining high employment records for graduates. Because this group will continue to comprise the majority of enrollees, it is imperative we not take their matriculation for granted.

(2a) The 18-21 year-old student of the future will of economic necessity be more vocationally minded than his or her predecessors. The technical level of the economy will require training in computers and mathematics of most occupations utilizing college graduates.

(2b) Management techniques, especially those involving human resources, will increasingly be the forte of those rising to the upper echelons of their chosen professions.

(2c) Greater attempts will be made to explore the interrelationships between disciplines in order to solve problems that will defy the logical and analytical tools of a single discipline.

(2d) Outside contacts--local, national and international--will provide broader career choice opportunities for students, new and exciting research problems for faculty, and a positive role for the University which will justify the continued funding of programs to taxpayers and legislatures.

(3a) As the knowledge base in all disciplines expands, disciplinary courses will be devoted to the theoretical underpinnings and application will come from student participation in larger community projects, co-op programs and the like.

(3b) Expansion of the knowledge base also implies the need to telescope more information into the same time frame. Increased attention to educational technology and the elimination of overlapping course content will make this possible.

(4a) With increased vocationalism will come greater attention to the placement of graduates. Jobs, especially in the knowledge and management-service sectors, are more national in scope than those in education. As the number of students graduating outside the education field increases, it will be imperative to build additional employment contacts which are national in scope.

(4b) A greater effort will be made to fit the specific talents of undergraduates, regardless of major, to specific jobs. Front-end loading--identifying employers and pre-selecting our best students for those jobs--is a good way to build a track record which will make the employment prospects of future graduates less difficult. A good employment record for past graduates can be a telling point in recruiting new students as well.

A POSTSCRIPT

An area ignored to now has been the future source of grant monies. Certainly individual faculty members should be supported in their efforts to secure grant money for projects in specific disciplines. As an institution, however, past performances as well as future trends suggest that our greatest comparative advantage may lie in the areas of educational technology and implementation of new delivery systems. Industries whose growth cycle is about to peak pay increasing attention to cost-effectiveness. Educational technology and new delivery systems promise to provide better quality education without significantly raising costs. From a grantsmanship standpoint, the reputation enjoyed by our School of Education suggests a more receptive ear from granting institutions in this area. A source of such monies may increasingly be the industrial sector, which is more frequently including educational benefits as part of fringe packages and has a vested interest in maintaining the quality of future labor force entrants.

Finally, I would be remiss if I did not leave a door slightly ajar as an escape route for many things discussed in this report. Graduate schools train narrow specialists and my discipline more than most places a low premium on eclecticism. I am prepared, as one of my colleagues colorfully suggested, to risk a high probability of forecast error and leave town under cover of darkness, placing copies of this report in roadside trash recepticals in order to prevent wider distribution and further declines in my reputation. Ideally, however, this report will stimulate thinking and result in some concensus concerning our futures. We lack a theory of academic evolution or an educational teleology allowing us to face the future with total confidence. Howard Bowen noted that "The higher education system in this country has been built on the whole in anticipation of demand and as a stimulant to that demand rather than as a response to existing demand." We must take care to ensure that Bowen's statement does not become an historical relic.

APPENDIX A

TABLE A - 1

PERCENT DISTRIBUTION OF GROSS NATIONAL PRODUCT, 1972, AND PROJECTED TO 1980 AND 1985

GROSS NATIONAL PRODUCT (DEMAND CONCEPT)	1972	1980	1985
Personal Consumption	62.9	62.2	62.5
Durable Goods	10.2	10.0	9.9
Nondurable Goods	26.0	24.7	24.1
Services	26.8	27.6	28.5
Gross Private Domestic Investment	15.4	16.1	15.9
Fixed Investment	14.9	15.1	15.2
Nonresidential	10.2	11.6	11.6
Structures	3.6	4.1	4.1
Producer Durable Equipment	6.6	7.5	7.5
Residential	4.7	3.6	3.6
Changes in Business Inventories	.5	.9	.8
Net Export of Goods and Services	-.4	.2	.2
Exports	6.4	8.1	8.7
Imports	6.8	7.8	8.5
Government Purchases of Goods & Services	22.1	21.5	21.4
Federal Government	9.0	7.6	7.2
National Defense	6.4	5.2	4.8
Other	2.6	2.5	2.4
State and Local Government	13.0	13.8	14.2

SOURCE: Bureau of Labor Statistics, The U.S. Economy in 1985, Bulletin 1809, Washington, D.C.: U.S. Government Printing Office, 1974, p. 19. Chester C. Levine, "Occupational Outlook Handbook in Brief," *Occupational Outlook Quarterly*, Summer, 1976.

TABLE A - 2

GROSS NATIONAL PRODUCT ORIGINATING IN VARIOUS SECTORS OF THE PRIVATE ECONOMY, 1972, AND PROJECTED TO 1980 AND 1985

SECTOR	1972	1980	1985
Agriculture	3.4	2.4	2.1
Nonagriculture	96.6	97.6	97.9
Mining	1.8	1.3	1.2
Contract Construction	5.5	4.8	4.4
Manufacturing	28.5	28.6	28.2
Durable	16.7	17.9	17.7
Nondurable	11.8	10.7	10.4
Transportation, Communication, and Public Utilities	10.0	11.0	11.4
Transportation	4.5	4.8	4.7
Communication	2.8	3.4	3.7
Public Utilities	2.7	2.8	3.0
Trade	19.1	18.7	18.0
Wholesale	7.6	7.7	7.5
Retail	11.4	11.0	10.5
Finance, Insurance, Real Estate	16.1	16.7	17.2
Other Services	13.3	14.9	15.3
Governmental Enterprises	1.8	1.7	1.7
Rest of World & Statistical Discrepancy	.6	.0	.4

SOURCE: Bureau of Labor Statistics, The U.S. Economy in 1985, Bulletin 1809, Washington, D.C.: U.S. Government Printing Office, 1974, p. 19. Chester C. Levine, "Occupational Outlook Handbook in Brief," Occupational Outlook Quarterly, Summer, 1976.

TABLE A - 3

PERCENT DISTRIBUTION OF EMPLOYMENT, BY MAJOR OCCUPATIONAL GROUP, 1960 AND 1974, AND PROJECTED 1980 AND 1985

Occupational Group	1960	1974	1980	1985
White Collar Workers	43.1	48.6	50.2	51.5
Professional & Technical	11.0	14.4	15.0	15.5
Managers & Administrators	11.2	10.4	10.4	10.5
Sales Workers	6.4	6.3	6.2	6.1
Clerical Workers	14.5	17.5	18.5	19.4
Blue-Collar Workers	36.3	34.7	33.6	32.6
Craft & Kindred Workers	13.3	13.4	13.4	13.4
Operatives	17.3	16.2	15.4	14.7
Nonfarm laborers	5.7	5.1	4.8	4.6
Service Workers	12.7	13.2	13.7	14.2
Private Household Workers	3.0	1.8	1.3	1.1
Other Service Workers	9.7	11.4	12.4	13.1
Farm Workers	7.9	3.6	2.6	1.8

SOURCE: Bureau of Labor Statistics, The U.S. Economy in 1985, Bulletin 1809, Washington, D.C.: U.S. Government Printing Office, 1974, p. 19. Chester C. Levine, "Occupational Outlook Handbook in Brief," Occupational Outlook Quarterly, Summer, 1976.

TABLE A - 4

INDUSTRIES EXPECTED TO GROW MORE RAPIDLY THAN PROJECTED GROWTH IN GNP TO 1985: OUTPUT CRITERION

INDUSTRY	INDUSTRY
Other nonferrous metal ore mining	Medical and dental instruments
Chemical and fertilizer mining	Photographic equipment and supplies
New Public Utilities	Miscellaneous manufactured products
Hosiery and knit goods	Air transportation
Chemical products	Other transportation
Agricultural chemicals	Communications, except radios & TV
Plastic materials and synthetic rubber	Electric Utilities
Synthetic fibers	Finance
Drugs	Owner occupied dwellings
Cleaning and toilet preparations	Miscellaneous business services
Rubber products	Miscellaneous professional services
Plastic products	Doctors, dentists, and other Medical services
Primary aluminum	Hospitals
Aluminum rolling and drawing	Post office
Heating apparatus & plumbing fixtures	Other Federal enterprises
Fabricated structural metal	State and local government enterprises
Other fabricated metal products	
Engines, turbines, generators	
Material handling equipment	
General industrial machinery	
Computers and peripheral equipment	
Typewriters and other office machines	
Service industry machines	
Electronic transmission & Distribution equipment	
Electric Industrial Apparatus	
Household appliances	
Electric lighting and wiring	
Telephone & telegraph apparatus	
Electronic components	
Miscellaneous electrical machinery	
Railroads, miscellaneous transportation equipment	
Transportation equipment, not elsewhere classified	

SOURCE: Bureau of Labor Statistics, The U.S. Economy in 1985, Bulletin 1809, Washington, D.C.: U.S. Government Printing Office, 1974, p. 19. Chester C. Levine, "Occupational Outlook Handbook in Brief," Occupational Outlook Quarterly, Summer, 1976.

TABLE A - 5

INDUSTRIES EXPECTED TO GROW MORE RAPIDLY THAN PROJECTED GROWTH IN CIVILIAN LABOR FORCE TO 1985: EMPLOYMENT CRITERION

INDUSTRY
Screw machine products
Other fabricated metal products
Engines, turbines, generators
Material handline equipment
General industrial machinery
Computers & peripheral equipment
Service industry machines
Electric transmission & distribution equipment
Electric lighting & wiring
Telephone & telegraph apparatus
Electronic components
Motor vehicles
Ship & boatbuilding & repair
Railroad, miscellaneous transportation equipment
Transportation equipment, not elsewhere classified
Medical & dental instruments
Photographic equipment & supplies
Truck transportation
Air transportation
Water & sanitary srevices
Wholesale trade
Retail trade
Finance
Insurance
Other real estate
Miscellaneous business services
Miscellaneous professional services
Automobile repair
Other amusements
Doctors, dentists & other medical service
Hospitals
Educational services
Nonprofit organizations
Post office
Other Federal enterprises
State & Local Government enterprises

SOURCE: See Table A - 4

TABLE A - 6

INDUSTRIES FALLING INTO RAPID GROWTH, EMPLOYMENT AND OUTPUT CRITERIA, TO 1985, BY SECTOR

- Manufacturing
  - Other fabricated metal products
  - Engines, turbines & generators
  - Material handline equipment
  - General industrial equipment
  - Miscellaneous manufacturing products
- Information
  - Computers & peripheral equipment
  - Electronic lighting & wiring
  - Telephone & telegraph apparatus
  - Electronic components
  - Other federal enterprises
  - State & local governmental enterprises
- Transporation
  - Railroad, other miscellaneous transportation equipment
  - Transportation equipment, not elsewhere classified
- Leisure Time
  - Photographic equipment and supplies
  - Air transportation
  - Other transportation
- Medical
  - Medical & dental instruments
  - Doctors, dentists & other medical services
  - Hospitals
- Management-Service
  - Finance
  - Miscellaneous business services
  - Miscellaneous professional services
  - Post office
  - Other federal enterprises
  - State and local government enterprises

SOURCE: See Table A-4

TABLE A - 7

OCCUPATIONS REQUIRING SOME COLLEGE OR COLLEGE DEGREE EXPECTED TO GROW FASTER THAN LABOR FORCE GROWTH, TO 1985

Professional and Related Occupations	Annual Growth Rate
Business. Administrative Occupations	
Accountants	2.1
Conservation Occupations	
Foresters	1.8
Forestry Aides	3.1*
Counseling Occupations	
Employment Counselors	4.0
Rehabilitation Counselors	3.7
School Counselors	2.4
Engineers	
Agricultural Engineers	2.0
Biomedical Engineers	2.7
Ceramic Engineers	2.8
Civil Engineers	2.3
Electrical Engineers	2.9
Industrial Engineers	3.4
Mechanical Engineers	2.2
Metallurgical Engineers	2.7
Health Service Occupations	
Dental Assistants	2.3*
Dental Laboratory Technicians	2.3*
Dental Hygienists	8.6
Dentists	2.2
Dietitians	2.2
Electrocardiographic Technicians	3.2*
Electroencephalographic Technicians	3.5*
Hospital Administrators	3.5*
Licensed Practical Nurses	5.3*
Medical Assistants	2.9*
Medical Laboratory Workers	1.9
Medical Records Librarians	7.4
Occupational Therapists	5.5

NOTE: * Indicates College Training Not Now Necessary

(Table A-7 Continued)

Professional and Related Occupations	Annual Growth Rate
Occupational Therapy Assistants	7.7
Optometric Assistants	4.6*
Physical Therapists	4.5
Physical Therapy Assistants	7.0*
Physicians (M.D.'s and D.O.'s)	3.0
Respiratory Therapists	4.5
Veterinarians	2.7
Radiologic Technologists	3.6*
Registered Nurses	2.6
Sanitarians	4.5
Speech Pathologists & Audiologists	1.8
Mathematics and Related Occupations	
Actuaries	3.8
Mathematicians	2.7
Statisticians	2.6
Natural Science Occupations	
Geologists	2.5
Geophysicists	2.5
Meteorologists	2.0
Oceanographers	2.2
Biochemists	2.8
Life Scientists	2.0
Physical Scientists	
Chemists	2.5
Food Scientists	2.0
Performing Artists	
Actors and Actresses	3.3
Musicians & Music Teachers	2.1
Singers & Singing Teachers	2.5
Social Scientists	
Anthropologists	4.0
Economists	2.0
Sociologists	3.3
Technicians	
Draftsmen	3.1
Engineering & Science Technicians	3.1
Writing Occupations	
Newspaper Reporters	1.9
Technical Writers	2.0

(Table A-7 Continued)

Professional and Related Occupations	Annual Growth Rate
Other Professional & Related Occupations	
Air Traffic Controllers	2.3
Architects	4.4
College Career Planning & Placement Counselors	2.2
Flight Engineers	2.4
Industrial Designers	2.6
Interior Designers & Decorators	2.0
Landscape Architects	4.1
Lawyers	1.8
Librarians	2.3
Pilots & Copilots	2.8
Programmers	3.5
Psychologists	3.5
Recreation Workers	3.8
Social Workers	3.1
Surveyors	2.6
Systems Analysts	4.6
Urban Planners	3.4
Managerial Occupations	
Bank Officers	2.6*
City Managers	3.4
Managers & Assistants (Hotel)	2.7
Clerical and Related Occupations	
Bank Clerks	2.6*
Bank Tellers	2.6*
Cashiers	2.4*
Front Office Clerks (Hotel)	2.7*
Receptionists	3.2*
Stenographers & Secretaries	3.7
Stock Clerks	3.0*
Traffic Agents & Clerks (Civil Aviation)	5.0*
Typists	2.5*
Sales Occupations	
Automobile Parts Countermen	2.2*
Automobile Service Advisors	2.2*
Manufacturers' Salesworker	2.0
Securities Salesworkers	1.9

(Table A - 7 Continued)

Professional and Related Occupations	Annual Growth Rate
Service Occupations	
Building Custodians	2.0*
Cosmetologists	2.3*
Firefighters	3.5*
Flight Attendants	5.2*
Guards	2.0*
Hospital Attendants	3.2*
Housekeepers & Assistants (Hote-)	2.7*
Police Officers (Municipal)	2.2
Social Service Aids	3.2*
State Police Officers	3.2

SOURCE: Bureau of Labor Statistics, The U.S. Economy in 1985, Bulletin 1809, Washington, D.C.: U.S. Government Printing Office, 1974, p. 19. Chester C. Levine, "Occupational Outlook Handbook in Brief," Occupational Outlook Quarterly, Summer, 1976.

TABLE A - 8

SUPPLY RESPONSE BY UNDERGRADUATE MAJOR: 1961, 1966, 1972 AND 1975 COHORTS

1961 COHORT

	MEN		WOMEN		TOTAL	
MAJOR FIELD	#	%	#	%	#	%
Arts & Humanities	28,382	10.98	26,641	23.13	55,023	14.72
Social Sciences	59,753	23.12	20,920	18.16	80,673	21.59
Biological Sciences	14,130	5.47	4,836	4.20	18,966	5.08
Physical Sciences	31,012	12.00	9,858	8.56	40,870	10.94
Education	12,414	4.80	22,020	19.12	34,434	9.21
Engineering	32,271	12.48	3,004	2.61	35,275	9.44
Business	45,441	17.58	9,772	8.48	55,213	14.78
Other	35,090	13.57	18,135	15.74	53,225	14.24
TOTAL	258,498	100.00	115,189	100.00	373,687	100.00

1966 COHORT

	MEN		WOMEN		TOTAL	
MAJOR FIELD	#	%	#	%	#	%
Arts & Humanities	30,990	10.63	59,101	23.98	90,091	16.75
Social Sciences	70,072	24.04	48,647	19.74	118,719	22.07
Biological Sciences	12,420	4.26	7,675	3.11	20,095	3.74
Physical Sciences	21,837	7.49	10,815	4.39	32,652	6.07
Education	9,283	3.18	61,793	25.07	71,076	13.21
Engineering	37,483	12.86	273	*	37,756	7.02
Business	72,886	25.01	11,203	4.55	84,089	15.62
Other	36,503	12.52	46,938	19.05	83,441	15.50
TOTAL	291,750	100.00	246,443	100.00	538,193	100.00

SOURCE: Bisconti, College Graduates, Appendix A.

(TABLE A - 8 Continued)

1972 COHORT

	TOTAL	
MAJOR FIELD	NUMBER	PERCENTAGE
Arts & Humanities	162,524	17.98
Social Sciences	289,002	31.98
Biological Sciences	53,346	5.90
Physical Sciences	50,456	5.58
Education	134,478	14.88
Engineering	45,221	5.00
Business	109,214	12.08
Other	59,541	6.59
TOTAL	949,260	100.00

SOURCE: Shingleton, Michigan State Economic Record, p. 1.

1975 COHORT

MAJOR FIELD	TOTAL PERCENTAGE
Arts & Humanities	10.0
Social Sciences	11.0
Biological Sciences	3.0
Physical Sciences	3.0
Education	14.0
Engineering	6.0
Business	16.0
Other	30.0
Undecided	7.0
TOTAL	100.00

SOURCE: CMU Freshman Profile, 1975. Figures are national.

BIBLIOGRAPHY

ACADEMIC REFORM AND FUTURE

Adam, Roy. "Interest Groups in American Education," *Comparative Education*, Vol. 11, #2 (June, 1975), pp. 165-74. CC. Vol. 7, #31 (August 4, 1975), p. 66.

Aldrich, James L. and Ardike, Robert E. "Six Views on the Improvement and Reform of American Education," *The Journal of Teacher Education*, Vol. 26, #2 (Summer, 1975), pp. 167-71. CC, Vol. 7, #35 (September 1, 1975), p. 50.

Allen, Dwight W. "The Future of Education--Where Do We Go From Here?" *The Journal of Teacher Education*, Vol. 26, #1 (Spring, 1975), pp. 41-46. CC, Vol. 7, #25 (June 23, 1975), p. 45.

Altbach, P.G. "Academic Images--Public and Private," The Journal of Higher Education, Vol. 47, #1 (Jan.-Feb., 1975), pp. 107-12. CC, Vol. 8, #11 (March 15, 1976), p. 72.

Anderson, David D. "Revitalizing Undergraduate Education: An Editorial Perspective," *University College Quarterly*, Vol. 21, #2 (January, 1975), pp. 2-3. CC. Vol. 8, #10 (March 8, 1976), p. 42.

Ayscough, Peter B. "Academic Reactions to Education Innovation," *Studies in Higher Education*, Vol. 1, #1 (March, 1976), pp. 3-10. CC, Vol. 8, #24 (June 14, 1976) p. 69.

Bell, Daniel. *The Coming of Post-Industrial Society*. New York: Basic Books, Inc., Publishers, 1973.

Berte, Neal R. "Bringing About Change in a Traditional University," *New Directions For Higher Education*, #10 (Summer, 1975), pp. 65-76. CC, Vol. 7, #31 (August 4, 1975), p. 62.

Binder, Arnold; Stokols, Daniel; and Catalano, Ralph. "Social Ecology: An Emerging Multidiscipline,' *The Journal of Environmental Education*, Vol. 7, #2 (Winter, 1975) pp. 32-43. CC. Vol. 8, #12 (March 22, 1976), p. 57.

Bowen, Howard R. "Teaching and Learning: 2000 a.d." *New Directions in Higher Education*, #42 (Winter, 1975), pp. 1-16.

Butler, Broadus N. "Higher Education Leadership in the Nation's Third Century," Educational Record, Vol. 57, #1 (Winter, 1976), pp. 53-57. CC, Vol. 8, #24 (June 14, 1976), p. 72.

Change: The Magazine of Higher Education. Editorial. "Academic Reform--Still a Pseudoscience," (November, 1975), pp. 11-12. CC, Vol. 7, #47, (November 24, 1975), p. 52.

(Academic Reform and Future, Continued)

Cheit, E.F. "What Price Accountability," Change: The Magazine of Higher Education, Vol. 7, #9 (November, 1975) pp. 3035. CC, Vol. 7, #47 (November 24, 1975), p. 52.

Conable, Daniel B. "Two Masters of the Sword: A Position Paper on Accountability," Peabody Journal of Education, Vol. 53, #4 (July, 1976), pp. 233-40. CC, Vol. 8, #33 (August 16, 1976), p. 63.

Cornwall, Malcolm G. "Authority v. Experience in Higher Education," Universities Quarterly, Vol. 29, #3 (Summer, 1975), pp. 272-98, CC, Vol. 7, #35 (September 1, 1975), p. 49.

Dyer, Prudence and Prentice, Margorie. "Planning Educational Futures," The Educational Forum, Vol. 39, #4 (May, 1976), pp. 479-83. CC. Vol. 8, #16 (April 19, 1976), p. 61.

Ehlers, Henry. (ed.). Crucial Issues in Education. CC. Vol. 7, #47 (November 24, 1975), p. 57. New York: Holt, Rinehart and Winston, 1973.

Faure, Edgar, et. al. Learning To Be: The World of Education Today and Tomorrow. Paris: UNESCO. 1972, CC, Vol. 7, #25 (June 23, 1975), p. 44.

Folger, John K.; Astin, Helen S.; and Bayer, Alan E. Human Resources and Higher Education. New York: Russell Sage Foundation, 1970.

Galbraith, J.K. The New Industrial State. Boston: Houghton-Mifflin Company, 1971.

Harris, John and Keller, Stephen P. "Assessment Meausres Needed for Competency-Based Higher Education." Peabody Journal of Education, Vol. 53, #4 (July, 1976), pp. 241-47. CC, Vol. 8, #33 (August 16, 1976), p. 63.

Harrison, Shelley A. and Stolurow, Lawrence M. (eds.). Improving Instructional Productivity in Higher Education. New Jersey: Educational Technology Publishers, 1975.

Hipple, Theodore W. The Future of Education: 1975-2000. Pacific Palisades: Goodyear Publishing Company, Inc., 1974.

Horn, A. "Academic Reform." Change: The Magazine of Higher Education, Vol. 8, #1 (February, 1976), p. 8. CC, Vol. 8, #10 (March 8, 1976), p. 47.

Hurn, Christopher J. "Some Optimistic Proposals for a Pessimistic Time," Higher Education Review, Vol. 7, #3 (Summer, 1975), pp. 3-18. CC, Vol. 7, #48 (December 1, 1975), p. 44.

Jackson, Barry L. and Richardson, Robert L. "Legal Issues in Higher Education: A Look Toward The Future," The Journal of College Student Personnel, Vol. 16, #6 (November, 1975), pp. 514-end. CC, Vol. 8, #9 (March 1, 1976), p. 61.

(Academic Reform and Future, Continued)

Kahn, Herman and Wiener, Anthony J. Toward the Year 2,000: A Framework For Speculation. New York: McMillan and Company, Inc., 1967.

Kaysen, Carl (ed.). Content and Context: Essays on College Education. New York: McGraw-Hill Book Company, 1973.

King, John P. "An American Perspective on Education and Change in a Technological Society," Intellect, Vol. 104, #2368 (October, 1975), pp. 114-18. CC, Vol. 7, #45 (November 10, 1975), p. 66.

Knapp, Stuart E. and Valentine, Carol A. "Goals for Postsecondary Instructional Delivery Systems," College and University, Vol. 51, #2 (Winter, 1976), pp. 121-37. CC, Vol. 8, #9 (March 1, 1976), p. 66.

Masini, Eleonora Barbieri, "Experience of Education Towards the Future," Convergence: International Journal of Adult Education, Vol. 8, #3 (1975), pp. 77-86. CC, Vol. 8, #10 (March 8, 1976), p. 46.

Meadows, Donella H.; Meadows, Dennis L.; Randers, Jorgen; and Behrens, William W., III, The Limits To Growth. Bergenfield, New Jersey: Signet Paperback, 1975.

McCarthy, Patrick E. "Higher Education: Expansion Without Growth." Daedalus, Winter, 1975, pp. 78-86.

Moor, James R., Jr. "An Economic Demographic Forecasting Model for the Detroit Region." Unpublished dissertation, Wayne State University, 1975.

Muller-Wolf, H.M. "Aims of Education in International Perspective," Scientia Paedagogica Experimentalis, Vol. 12, #2 (1975), pp. 207-15. CC, Vol. 8, #9 (March 1, 1976), p. 62.

New Directions For Higher Education, Entire Issue. #12, (Winter, 1975), CC, Vol. 8, #6 (February 9, 1976), p. 43.

Pratt, Judith A. and Schanback, Steve. "World Crisis and the Tasks of Progressive Educators," Educational Leadership, Vol. 32, #8 (May, 1975), pp. 537-42. CC, Vol. 7, #23 (June 9, 1975), p. 66.

Raskin, Marcus, "The University in the Next Century," Educational Record, Vol. 57, #1 (Winter, 1976), pp. 65-end. CC, Vol. 8, #24 (June 14, 1976), p. 72.

Rowse, Glenwood L.; Howes, Nancy J. and Gustafson, David H. "Role Based Curriculum Development in Higher Education," Educational Technology, Vol. 15, #7 (July, 1975), pp. 13-22. CC, Vol. 7, #33 (August 18, 1975), p. 65.

Rush, Donald E.; Lawter, William L.; Thomason, Julia Tiller and Atkisson, Lovelle. "Essential Components for Effective Curriculum Development," Peabody Journal of Education, Vol. 53, #4 (July, 1976), pp. 296-98. CC, Vol. 8, #33 (August 16, 1976) p. 63.

(Academic Reform and Future, Continued)

Sternlieb, George and Hughes, James W. *Post-Industrial America: Metropolitan Decline and Inter-Regional Job Shifts.* New Brunswick: Center for Urban Policy Research, 1975.

Stone, Lawrence. *The University in Society*. CC, Vol. 7, #25 (June 23, 1975), p. 40.

Warnock, Geoffrey. "Education and Pluralism: What Sort of Problems?" *Oxford Review of Education*, Vol. 1, #2 (1975), pp. 93-98. CC, Vol. 7, #25 (June 23, 1975), p. 53.

ECONOMIC MODELS OF EDUCATIONAL SECTOR

Aarestad, J. "On the Optimal Allocation of Labor to the Educational Sector," *Swedish Journal of Economics*, Vol. 77, #3 (1975), pp. 303-17. JEL, Vol. XIV, #2 (June, 1976), p. 703.

Averill, Richard F. and Suttle, J. Lloyd. "A Model for University Enrollment Planning," *Socio-Economic Planning Sciences*. Vol. 9, #6 (December, 1975), pp. 257-62. COREJ w/e 30th January 1975, p. 12.

Barry, Leonard L. and George, William R. "Marketing the University: Opportunity in an Era of Crisis," *Atlanta Economic Review*, Vol. 25, #4 (July-August, 1975), pp. 4-8. CC, Vol. 7, #34 (August 25, 1975), p. 51.

Berman, Gerlad S. and Haug, Marie R. "Occupational and Educational Goals and Expectations: The Effects of Race and Sex," *Social Problems*, Vol. 23, #2 (December, 1975), pp. 166-81. CC, Vol. 8, #24 (June 14, 1976), p. 24.

Cyert, Richard M. *The Management of Nonprofit Organizations: With Emphasis on Universities.* Lexington Heath, Lexington Books, 1975. JEL, Vol. XIV, #2 (June, 1976), p. 565.

Dresch, Stephen P. "Demography, Technology and Higher Education: Toward a Formal Model of Educational Adaptation." *Journal of Political Economy*, Vol. 83, #3 (June, 1975), pp. 535-70.

Dunsworth, John and Cook, Rupert. "Budgetary Devolution as an aid to University Efficiency," *Higher Education*, Vol. 5, #2 (May, 1975), pp. 153-68. CC, Vol. 8, #22 (May 31, 1976), p. 55.

Fuller, B. "Framework for Academic Planning," *The Journal of Higher Education*, Vol. 47, #1 (Jan. - Feb., 1976), pp. 65-78. CC. Vol. 8, #11 (March 15, 1976), p. 72.

(Economic Models of Educational Sector, Continued)

Kershaw, Joseph A. and Mood, Alex M. "Resource Allocation in Higher Education," American Economic Review, Vol. LX, #2 (May, 1970), pp. 341-46.

MacRae, Duncan, Jr. "The University and the Utility of Policy Analysis," Policy Studies Journal, Vol. 4, #3 (Spring, 1976), pp. 286-88. CC, Vol. 8, #19 (May 10, 1976), p. 84.

McConnell, T.R. "Coordinating Higher Education," Higher Education Review, Vol. 8, #1 (Autumn, 1975), pp. 45-58. CC, Vol. 8, #12 (March 12, 1976), p. 58.

Morris, Alfred. "Changing the Ways of Allocating Resources to Universities," Higher Education Review, Vol. 7, #1 (Fall, 1974), pp. 8-36. CC, Vol. 7, #24 (June 16, 1975), p. 65.

Morrison, Peter A. The Demographic Context of Educational Policy Planning, Report P-5592. Santa Monica: The RAND Corporation, 1976.

O'Neill, June. "Resource Use in Higher Education: Trends in Outputs and Inputs, 1930-1967," In Carnegie Commission on Higher Education Sponsored Research of the Carnegie Commission on Higher Education. New York: McGraw-Hill Book Company, 1975

Richman, BM and Farmer, Rn. Leadership, Goals and Power in Higher Education. CC, Vol. 8, #11 (March 15, 1976), p. 72. San Francisco: Jossey-Bass Publishers, 1974.

Spuck, Dennis W.; Hubert, Lawrence J; and Lufler, Henry S., Jr. "An Introduction to Educational Policy Research," Education and Urban Society, Vol. 7, #3 (May, 1975), pp. 211-19. CC, Vol. 7, #29 (July 21, 1975), p. 53.

Vaccaro, Louis C. "Planning in Higher Education: Approaches and Problems," College and University, Vol. 51, #2 (Winter, 1976), pp. 153-60.

Windham, Douglas M. "The Macro-Planning of Education: Why It Fails, Why It Survives, and the Alternatives," Comparative Education Review, Vol. 19, #2, (June, 1975), pp. 187-201. CC, Vol. 7 #29 (July 21, 1975), p. 60.

Young, Kenneth E. "Evaluating Institutional Effectiveness," Educational Record, Vol. 57, #1, (Winter, 1976), pp. 45-52. CC, Vol. 8, #24 (June 14, 1976), p. 72.

ENROLLMENTS

Anderson, Richard E. "Private/Public Higher Education and the Competition for High Ability Students," The Journal of Human Resources, Vol. 10, #4, (Autumn, 1975), pp. 500-11. CC, Vol. 8, #10 (March 8, 1976), p. 24.

Barnard, G.A. and McCreath, M.D. "Subject Commitments and the Demand for Higher Education." Journal of the Royal Statistical Society, Vol. 133, #3 (1970), pp. 358-408.

Britney, Robert R. "Forecasting Educational Enrollments: Comparison of a Markov Chain and Circuitless Flow Network Model," Socio-Economic Planning Sciences, Vol. 9, #2

Brown, B.W. "Achievements Costs, and the Demand for Public Education." Western Economic Journal, Vol. 10, #2 (June, 1972), pp. 198-219.

Burns, J.M. and Chiswick, B.R., "Analysis of the Effects of a Graduated Tuition Program at State Universities." Journal of Human Resources, Vol. 5, #2 (Spring, 1970), pp. 237-45.

Campbell, Robert and Siegel, B.N. "Demand for Higher Education in the United States," American Economic Review, Vol. LVII, #3 (June, 1967), pp. 482-95.

Carrington, Christine H. and Sedlacek, William E. "Characteristics of No-Shows Accepted for Admission at a Large University," The Journal of College Student Personnel, Vol. 16, #6 (November, 1975), pp. 504-07. CC, Vol. 8, #9 (March 1, 1976), p. 61.

Christensen, Sandra; Melder, John; and Weisbrod, Burton A. "Factors Affecting College Attendance." Journal of Human Resources, Vol. X, #2, pp. 174-88.

Carlsson, R.J. "Federal Program of Student Loans." American Journal of Economics and Sociology, Vol. 29, #3 (July, 1970), pp. 263-76.

Change: The Magazine of Higher Education. "Enrollment Trends," Vol. 8, #1 (February, 1976), p. 4, CC, Vol. 8, #10 (March 8, 1976), p. 47.

Dresch, S.P. and Goldberg, R.D. "Variable Term Loans for Higher Education - Analytics and Empirics," Annals of Economic and Social Measurement, Vol. 1, #1 (January, 1972), pp. 59-92.

Edwards, Linda Nasif. "School Retention of Teenagers Over the Business Cycle," The Journal of Human Resources, Vol. 11, #2 (Spring, 1976), pp. 200-08, CC, Vol. 8, #23 (June 7, 1976), p. 29.

Galper H. and Dunn, R.M., Jr. "A Short-Run Demand Function for Higher Education in the United States." Journal of Political Economy, Vol. 77, #5 (September-October, 1969), pp. 765-77.

(Enrollments, continued)

Gordon, Milton A. "An Analysis of Enrollment Data for Black Students in Institutions of Higher Education, 1940-1972." The Journal of Negro Education, Vol. 45, #2 (Spring, 1976), pp. 117-21. CC, Vol. 8, #24 (June 14, 1976), p. 74.

Gorman, Walter P. "An Evaluation of Student-Attracting Methods and University Features by Attending Students," College and University, Vol. 51, #2 (Winter, 1976), pp. 220-25. CC, Vol. 8, #9, (March 1, 1976), p. 66.

Grant, W. Vance. "Toward New Peaks in Education," American Education, Vol. 11, #8 (October, 1975), pp. 6-9, CC, Vol. 7, #45 (November 10, 1975), p. 62.

Hight, Joseph E. "The Demand for Higher Education in the U.S. 1927-72: The Public and Private Institutions," The Journal of Human Resources, Vol. 10, #4 (Autumn, 1975), pp. 512-20. CC, Vol. 8, #10 (March 8, 1976), p. 24.

Hoenack, Stephen A. and Weiler, William C. "Cost-Related Tuition Policies and University Enrollments," The Journal of Human Resources, Vol. 10, #3, (Summer, 1975), pp. 332-60.

Hoenack, Stephen A. "The Efficient Allocation of Subsidies to College Students," American Economic Review, Vol. LXI, #3, Part I (June, 1971), pp. 302-11.

Jackson, G.A. and Weathersby, G.B. "Individual Demand for Higher Education: Review and Analysis of Recent Empirical Studies," The Journal of Higher Education, Vol. 46, #6 (November-December, 1975), pp. 623-52. CC, Vol. 8, #2 (January 12, 1976), p. 54.

Johnson, Gary P. and Leslie, Larry L. "Increasing Public Tuition in Higher Education: An Alternative Approach to the Equity Issue," Educational Administration Quarterly, Vol. 12, #1 (Winter, 1976), pp. 27-42. CC, Vol. 8, #11 (March 15, 1976), p. 71.

Johnson, D.E., "Tax Credits and Scholarships for Education." Business and Government Review, Vol. 9, #5 (September-October, 1968), pp. 31-38.

Kieft, Raymond N. "Assumptions for Planning: University Enrollment, 1976-77 through 1985-86." Mimeo, August, 1976, Central Michigan University.

Kieft, Raymond N. "Assumptions for Planning: University Student Credit Hour and Fiscal Year Equated Student Enrollment, 1976-77 through 1986-87," Mimeo, August, 1976, Central Michigan University.

Kieft, Raymond N. "Enrollment Forecasting Using Mathematical Iteration and an Induced Course Load Matrix," College and University, forthcoming.

(Enrollments, continued)

Lunneborg, Clifford E. and Lunnebory, Patricia W. "Characteristics of University Graduates Who Were Community College Transfers," The Journal of College Student Personnel, Vol. 17, #1 (January, 1976), pp. 61-5. CC, Vol. 8, #22 (May 31, 1976), p. 52.

Moor, James R., Jr. "Shift/Share Analysis Applied to Department-Specific Enrollment," Mimeo, October, 1975, Central Michigan University.

Owen, J.D. "The Economics of College Scholarship Policy." Social Resources, Vol. 39, #1 (Spring, 1972) pp. 53-69.

Peltzman, Sam. "The Effect of Government Subsidies-in-Kind on Private Expenditures: The Case of Higher Education," Journal of Political Economy, Vol. 81, #1 (January/February, 1973), pp. 1-27.

Robinson, Albert J. "Government Subsidy to Higher Education: Benefits, Costs and Non-Economic Value of the Policy," American Journal of Economics and Sociology, Vol. 30, #3 (July, 1971), pp. 259-74.

Steahr, Thomas E. "College Student Migration to Predominantly Black Institutions of Higher Education in the United States," Review of Public Data Use, Vol. 4, #3 (May, 1976), pp. 34-41. CC, Vol. 8, #26, (June 28, 1976), p. 58.

Thurow, Lester, "Education and Social Policy," The Public Interest, #28, Summer, 1972.

Tuckman, H.P. "Determinanets of College Student Migration." Southern Economic Journal, Vol. 37, #2 (October, 1970), pp. 184-89.

Tuckman, H.P. "Local Colleges and the Demand for Higher Education: The Enrollment Inducing Effects of Location." American Journal of Economics and Sociology, Vol. 32, #3 (July, 1973), pp. 257-68.

GRADUATE EDUCATION

Benson, Edmund, et. al. Graduate Education at Central Michigan University: Purpose, Problem, Potential. Mt. Pleasant: Central Michigan University Press, 1975.

Chambers, Peter. "Postgraduate Education: Babies or Bathwater?" British Journal of Teacher Education, Vol. 2, #2 (May, 1975), pp. 137-42. CC, Vol. 8, #24 (June 14, 1976), p. 75.

Dube, W.F. and Johnson, David G. "Study of U.S. Medical School Applicants, 1973-74." Journal of Medical Education, Vol. 50, #11 (November, 1975), pp. 1015-33. CC, Vol. 7, #49 (December 8, 1975), p. 45.

(Graduate Education, Continued)

Grossman, Michael. *The Demand for Health: A Theoretical and Empirical Investigation*, National Bureau of Economic Research Occasional Paper 119. New York: Columbia University Press, 1972.

Hecker, Jo Anne K. "American Graduate Education: From Reverence to Relevance," *Intellect*, Vol. 104, #2374 (April, 1976) pp 504-08. CC, Vol. 8, #19 (May 10, 1976), p. 69.

HIGHER EDUCATION AND THE LABOR MARKET

Abramson, E.W. "Projected Demand for and Supply of Ph.D. Manpower, 1972-85," *Monthly Labor Review*, Vol. 98, #12 (December, 1975), pp. 52-53. JEL, Vol. XIV, #2 (June, 1976), p. 702.

Barabba, Vincent P. "The National Setting: Regional Shifts, Metropolitan Decline and Urban Decay," In George Sternlieb and James W. Hughes, eds. *Post-Industrial America: Metropolitcan Decline and Inter-Regional Job Shifts*. New Brunswick: Center for Urban Policy Research, 1975.

Berg, Ivan. *Education and Jobs: The Great Training Robbery*. Boston: Beacon Press, 1971.

Cartter, Allen N. "Whither the Market for Academic Economists," *American Economic Review*, Vol. LXI, #2 (May, 1971), pp. 305-10.

College Placement Council, Inc. *Four-Year Liberal Arts Graduates: Their Utilization in Business, Industry, and Government--The Problem and Some Solutions*. Bethlehem, Pa.: The CPC Foundation, 1975.

Conger, Darius J. and Campbell, John M., Jr. "Population Dynamics," *International Economic Review*, forthcoming.

Fisher, F.D. "Educating for Underemployment," *Change: The Magazine of Higher Education*, Vol. 8, #1 (February, 1976), pp. 16-19. CC, Vol. 8, #10 (March 8, 1976), p. 47.

Fleming, W.H. "Job Prospects for Ph.D.'s in the Mathematical Sciences," *Notices American Mathematical Society*, Vol. 22 (December, 1975), pp. 377-80. CC, Vol. 8, #16 (April 19, 1976), p. 15.

Freeman, Richard B. *The Over-Educated American*. New York: Academic Press, 1976.

Gordon, Margaret S. (ed.). *Higher Education and the Labor Market*. New York: McGraw-Hill Book Company, 1974.

Griliches, Zvi and Mason, William M. "Education, Income and Ability," *Journal of Political Economy*, Vol. 80, #3, Part II (May/June, 1972), pp. S75-S103

Gronau, Reuben. "Information and Frictional Unemployment," American Economic Review, Vol. LXI, #3, Part I (June, 1971) pp. 290-301.

Haber, William. "College and the Changing Job Market," The American Federationist, Vol. 83, #6 (June, 1976), pp. 23-end. CC, Vol. 8, #29 (July 19, 1976), p. 79.

Havinghurst, Robert J. "More Youth Than Jobs," The Center Magazine, Vol. 9, #3 (May-June, 1976), pp. 16-19. CC, Vol. 8, #23 (June 7, 1976), p. 30.

Hencke, David. "Teacher Supply: A Case of Manpower Planning," Higher Education Review, Vol. 8, #1 (Autumn, 1975), pp. 17-32. CC, Vol. 8, #12 (March 22, 1976), p. 58.

Judge, Ken. "Economic Analysis and Productive Efficiency in the Personal Social Services: The Differential Use of Manpower," International Journal of Social Economics, Vol. 3, #2 (1976), pp. 89-108. CC, Vol. 8, #32, (August 9, 1976), p. 61.

Krumboltz, John D. "A Social Learning Theory of Career Selection," The Counseling Psychologist, Vol. 6, #1 (1976), pp. 71-80. CC, Vol. 8, #35 (August 30, 1976) p. 65.

Moore, Gary A. "The Effect of Collective Bargaining on Internal Salary Structures in the Public Schools," Industrial and Labor Relations Review, Vol. 29, #3 (April, 1976), pp. 352-62. COREJ w/e 28th May, 1976, p. 5.

Levitt, Theodore. "Management and the 'Post-Industrial' Society," The Public Interest, #44 (Summer, 1976), pp. 69-103.

Mincer, Jacob. "Unemployment Effects of Minimum Wages." Journal of Political Economy, Vol. 84, #4, Part 2 (August, 1976), pp. S87-S105.

Moor, James R., Jr. and Mattila, John W. Michigan Building and Construction Traders Craft Manpower Study. Detroit: Citizens Research Council of Michigan, 1974.

Morgan Guaranty Survey, "Rising Survey Costs--The Spiral Slows," July 1976, pp. 4-7.

Nixon, Richard M. The Economic Report of the President, Washington, D.C.: U.S. Government Printing Office, 1973.

Norris, W.K. "Manpower Aspects of Technical Progress," International Journal of Social Economics, Vol. 3, #2 (1976), pp. 74-88. CC, Vol. 8, #32 (August 9, 1976), p. 61.

O'Toole, James. "The Reserve Army of the Underemployed: I-The World of Work." Change: The Magazine of Higher Education, Vol. 7 #4 (1975), pp. 26-33, 66.

Radner, R. and Miller, L.S. "Demand and Supply in U.S. Higher Education: A Progress Report," American Economic Review, Vol. LX, #2 (May, 1970), pp. 326-34.

Revzin, Philip. "Back to the Books," The Wall Street Journal, Spril 14, 1976, p. 32.

Ritzen, Jo M. "Manpower Targets and Educational Investments," Socio-Economic Planning Sciences, Vol. 10, #1 (1976), pp. 106. CC, Vol. 8, #12, March 22, 1976), p. 33.

Ritzman, Larry P.; Krajewski, Leroy J. and Showalter, Michael J. "The Disaggregation of Aggregate Manpower Plans," Management Science, Vol. 22, #11 (July, 1976), pp. 1204-14. CC, Vol. 8, #31 (August 2, 1976), p. 71.

Rosen, Sherwin and Welch, Finis. "Labor Supply and Income Redistribution," The Review of Economic and Statistics, Vol. LIII, #3 (August, 1971), pp. 278-82.

Schiller, Bradley R. "Equality, Opportunity, and the 'Good Job'", The Public Interest, No. 43 (Spring, 1976), pp.111-20.

Shaffer, Richard A. "Down the Ladder." The Wall Street Journal, January 1, 1975, p. 1, 8.

Shells, M. et. a. "Who Needs College?" Newsweek, 26 April, 1976, pp. 60-69. CC, Vol. 8, #26 (June 28, 1976), p. 16.

Shingleton, John D. "The Job Market and a College Degree," The Michigan State Economic Record, Vol. 18, #2 (March-April, 1976), p. 3-2 and 7-8.

Weiss, Yoram. "The Risk Element in Occupational and Educational Choices," Journal of Political Economy, Vol. 80, #6 (November/December, 1972), pp. 1203-13.

Wool, Harold. "Future Labor Supply for Lower Level Occupations," Monthly Labor Review, Vol. 99, #3 (March, 1976), pp. 22-31. CC, Vol. 8, #16, (April, 19, 1976), p. 76.

Young, Anne McDougall. "Students, Graduates, and Dropouts in the Labor Market, October, 1975." Montly Labor Review, Vol. 99, #6 (July, 1976), pp. 37-41. CC, Vol. 8, #34 (August 23, 1976), p. 73.

HIGHER EDUCATION: GENERAL

Becker, Gary S. "A Theory of the Allocation of Time." Economic Journal, Vol. 75, (September, 1965), pp. 493-517.

Bok, Derek. "On the Purpose of Undergraduate Education." Daedalus, Fall (1974), pp. 159-172.

Brickman, William W. "Education, Culture, and American Revolution in International Context," Intellect, Vol. 105, #2376 (July - August, 1976), pp. 33-34. CC, Vol. 8, #33 (August 16, 1976), p. 68.

Carnegie Commission on Higher Education. Sponsored Research of the Carnegie Commission on Higher Education. New York: McGraw-Hill Book Company, 1975.

Conger, Darius J. and Canarella, Giorgio. "Efficiency and Production in Soviet Industry," L'Est, Vol. 3, #4 (December, 1974), pp. 41-67.

Culp, David. "Welfare Reform: The Negative Income Tax." Unpublished Master's Thesis, Central Michigan University, 1976.

DeMartini, Joseph R. "Student Culture as a Change Agent in American Higher Education: An Illustration from the Nineteenth Century," Journal of Social History, Vol. 9, #4 (Summer, 1976), pp. 526-41. CC, Vol. 8, #24 (June 14, 1976), p. 102.

Dennison, Edward F. Why Growth Rates Differ. Washington, D.C.: The Brookings Institution, 1967.

Derr, C. Brooklyn. "Crisis and Contingencies for the Small Private College," Teachers College Record, Vol. 77, #2 (December, 1975) pp. 231-46. CC, Vol. 8 #6 (February 9, 1976), p. 41.

Else, Gerald F. "Some Ill-Tempered Reflections on the Present State of Higher Education in the United States." Daedalus, Fall (1974), pp. 138-142.

Farber, Stephen C. "A Labor Shortage Model Applied to Migration of College Professors," The Journal of Human Resources, Vol. 10, #4 (Autumn, 1975), pp. 482-99. CC, Vol. 8, #10 (March 18, 1976), p. 24.

Feshbach, Murray and Rapaway, Stephen. "Labor Constraints in the Five-Year Plan." In Joint Economic Committee, Soviet Economic Prospects for the Seventies. Washington, D.C.: U.S. Government Printing Office, 1973, pp. 485-564.

Fleming, R.W. "Reflections on Higher Education." Daedalus, Winter, 1975, pp. 8-15.

(Higher Education: General, Continued)

Flora, J.L. "Equity in Financing Education," The American Journal of Economics and Sociology, Vol. 35, #2 (April, 1976), pp. 175-90. CC, Vol. 8, #24 (June 14, 1976), p. 24.

Glenny, Lyman A. "Financing Postsecondary Education in the U.S.A.," Higher Education, Vol. 5, #1 (February, 1976) pp. 103-end. CC, Vol. 8, #10 (March 8, 1976), p. 44.

Houthakker, H.S. "An International Comparison of Household Expenditure Patterns, Commemorating the Centenary of Engel's Law," Econometrica, Vol. 25 (October, 1975), pp. 532-51.

Joint Economic Committee. Soviet Economic Prospects for the Seventies. Washington, D.C.,: U.S. Government Printing Office, 1973.

Kaysen, Carl (ed.). Content and Context: Essays on Higher Education. New York: McGraw-Hill Book Company, 1973.

Ladd, E.C., Jr. "Where Should Cutbacks Come?" Chronicle of Higher Education, 12 April, 1976, p. 7. CC, Vol. 8, #26 (June 28, 1976), p. 17.

Mayhew, Lewis B. (ed.) The Carnegie Commission on Higher Education, San Francisco: Jossey-Bass Publishers, 1974.

Mathews, D. "Government and Universities," Change: The Magazine of Higher Education, Vol. 8, #1 (February, 1976). pp. 6 CC, Vol. 8, #10, (March 8, 1976), p. 47.

Metzger, Walter P. "The American Academic Profession in 'Hard Times.'" Daedalus, Winter, 1975, pp. 25-44.

Ross, Alec. "Education as an Undergraduate Subject," Universities Quarterly, Vol. 29, #3 (Summer, 1975), pp. 251-57. CC, Vol. 7, #35 (September 1, 1975), p. 49.

Speigelberg, M.F. "Career Education and the Teaching of Foreign Languages." Foreign Language Annals, Vol. 9 (April, 1976) pp. 160-64. CC, Vol. 8, #35 (August 30, 1976), p. 26.

Squires, Geoffrey. "The Resuscitation of General Education," Studies in Higher Education, Vol. 1, #1 (March, 1976), pp. 83-90. CC, Vol. 8, #24 (June 14, 1976), p. 69.

Stark, Joan S. "The Emerging Consumer Movement in Education," New Directions in Higher Education, #13, (Spring, 1976), pp. 1-9. CC, Vol. 8, #24 (June 14, 1976), p. 70.

Summerfield, Harry L. Power and Process: The Formulation and Limits of Federal Educational Policy. Berkley, Calif.: McCutchan Publishers, 1974. CC, Vol. 8, #6 (February 9, 1976), p. 41.

Trow, Martin. "Higher Education and Moral Development," AAUP Bulletin Vol. 62, #1 (April, 1976), pp. 20-28. CC, Vol. 8, #24 (June 14, 1976), p. 75.

(Higher Education: General, Continued)

Versey, Laurence. "Stability and Experiment in the American Undergraduate Curriculum." In Carl Keysen (ed.), Content and Context: Essays on College Education. New York: McGraw-Hill Book Company, 1973.

Wallis, W. Allen. "Unity in the University," Daedalus, Winter, 1975, pp. 68-77.

Whitman, Marina v. N. "The 'Dismal Science' Comes of Age: Economics in America's Third Century," Sloan Management Review, Vol. 17, #3 (Spring, 1976), pp. 83-end. CC, Vol. 8, #32 (August 9, 1976), p. 65.

Wolanin, Thomas R. "Federal Policy Making in Higher Education." AAUP Bulletin, Vol. 61, #4 (December, 1975), pp. 309-15. CC, Vol. 8, #6, (February 9, 1976).

Yankelovich, Daniel. The New Morality - A Profile of American Youth in the '70's. New York: McGraw-Hill Book Company, 1974.

HIGHER EDUCATION AS AN INVESTMENT

Agnello, Richard J.and Hunt, Joeseph W., Jr. "The Impact of a Part-Time Graduate Degree and Early Career Earnings on Late-Career Earnings," The Journal of Human Resources, Vol. 11, #2 (Spring, 1976), pp. 209-218. CC, Vol. 8, #23 (June 7, 1976), p. 29.

Atkinson, G.B.J. "The Value of a B.Ed. Degree," Higher Education Review, Vol. 7, #3 (Summer, 1975), pp. 60-end. CC, Vol. 7, #48 (December 1, 1975), p. 45.

Barnes, William F. and Jones, Ethel B. "Women's Increasing Unemployment: A Cyclical Interpretation," The Quarterly Review of Economics and Business, Vol. 15, #2 (Summer, 1975), pp. 61-70. CC, Vol. 7, #31 (August 4, 1975), p. 69.

Bisconti, Ann Stouffer and Gomberg, Irene L. The Hard-To-Place Majority--a National Study of the Career Outcomes of Liberal Arts Graduates. Bethlehem, Pa.: The CPC Foundation, Report #5, 1975.

Bisconti, Ann Stouffer. College Graduates and Their Employers--a National Study of Career Plans and Their Outcomes. Bethlehem, Pa.: The CPC Foundation, Report #4, 1975.

Blitz, Rudolph C. and Ow, Chin Hock. "A Cross Sectional Analysis of Women's Participation in the Professions," Journal of Political Economy, Vol. 81, #1 (January/February, 1973), pp. 145-57.

(Higher Education as an Investment, Continued)

Campbell, John M. Jr., and Curtis, Thomas P. "Graduate Education and Private Rates of Return: A Review of Theory and Empiricism." Economic Inquiry, Vol. XIII, #1 (March, 1975), pp. 99-118.

Carlinger, Geoffrey. "Returns to Education for Blacks, Anglos and Five Spanish Groups," The Journal of Human Resources, Vol. 11, #2 (Spring, 1976), pp. 172-84. CC, Vol. 8, #23 (June 7, 1976), p. 29.

Carnoy, Martin and Marenbach, Dieter. "The Return to Schooling in the United States, 1939-1969," The Journal of Human Resources, Vol. 10, #3 (Summer, 1975), pp. 312-31.

Chamberlain, G.: "Education, Income and Ability Revisited." 45p. 1974. (Harvard University. Harvard Institute of Economic Research. Discussion Paper 392).

Dore, R.P. "Human Capital Theory, the Diversity of Societies and the Problem of Quality in Education," Higher Education, Vol. 5, #1 (February, 1976), pp. 79-102. CC, Vol. 8, #10 (March 8, 1976), p. 44.

Eckhaus, Richard S.; Safty, Ahmad El; and Norman, Victor D. "An Appraisal of the Calculations of Rates of Return to Higher Education." In Margaret S. Gordon (ed.) Higher Education and the Labor Market. New York: McGraw-Hill Book Company, 1974.

Edmonds, Thom. "Financing Graduate and Graduate Professional School Education," Education and Urban Society, Vol. 8, #3 (May, 1976), pp. 333-54. CC, Vol. 8, #26 (June 28, 1976), p. 49.

Featherman, D.L.: "Sexual Inequalities and Socioeconomic Achievement in the U.S., 1962-1973." 41p. 1975. (University of Wisconsin. Institute for Research on Poverty. Discussion Paper 275-75).

Freeman, Richard B. "Overinvestment in College Training?" The Journal of Human Resources, Vol. 10, #3, (Summer, 1975) pp. 287-311.

Freeman, R.B. "The Decline in the Economic Value of College Education." Working Papers on Economic Subjects received in the Library of the University of Warwick. 32 p. 1975. Discussion Paper 438.

Freeman, R.B.: "The Declining Economic Value of Higher Education and the American Social System." 68p. 1975. (Harvard University. Harvard Institute of Economic Research. Discussion paper 421).

Griffin, Larry J. "Specification Biases in Estimates of Socioeconomic Returns to Schooling," Sociology of Education, Vol. 49, #2 (April, 1976), pp. 121-38. CC, Vol. 8, #22 (May 31, 1976), p. 23.

Griliches, Zvi. "Estimating the Returns to Schooling: Some Econometric Problems," 46 p. 1975. (Harvard University Institute of Economic Research. Discussion Paper 433).

Griliches, Zvi. "The Changing Economics of Education." 15p. 1975. (Harvard University. Harvard Institute of Economic Research. Discussion Paper 426).

Hansen, W. Lee. "Income Distribution Effects of Higher Education," American Economic Review, Vol. LX, #2 (May, 1970), pp. 335-40.

Haseltine, Robert W. "Economic Conditions and the Growth of America: 1776 and 1976," Intellect, Vol. 105, #2376 (Jul.-Aug., 1976), pp. 30-32. CC, Vol. 8, #33 (August 16, 1976), p. 68.

Howe, Harold II. "The Value of College: A Non-Economists View," Educational Record, Vol. 57, #1 (Winter, 1976), pp. 5-12. CC, Vol. 8, #24 (June 14, 1976), p. 72.

Jowett, D. "Value of College--Continuing Debate," Change: The Magazine of Higher Education, Vol. 8, #1 (February, 1976), p. 7. CC, Vol. 8, #10 (March 8, 1976), p. 47.

Killingsworth, M.R.: "Human Capital and the Life-Cycle of Earnings." 42p. 1975 (Princeton University. Industrial Relations Section. Working Paper 81).

Lazeau, E.: "Education: Consumption or Production." 48p. 1975. (University of Chicago: Center for Mathematical Studies in Business and Economics. Report 7516).

Luecke, Daniel F. and McGinn, Noel F. "Education Production Functions: Can They Be Trusted?" Harvard Educational Review, Vol. 45, #3 (August, 1975), pp. 325-50. CC, Vol. 7, #45 (November 10, 1976), p. 60.

Mallan, John P. "The Cost of Education Controversy," Change: The Magazine of Higher Education, Vol. 7, #5 (June, 1975), Vol. 7, #25 (June 23, 1975), p. 40.

Oster, A.W. "Exchange on Value of College Going," Change: The Magazine of Higher Education, Vol. 7, #9 (November, 1975), pp. 6. CC, Vol. 7, #47 (November 24, 1975), p. 52.

Parsons, Donald O. "Intergenerational Transfers and Educational Decision," Quarterly Journal of Economics, Vol. 89, #4 (November, 1975), pp. 603-17. CC, Vol. 8, #2 (January 12, 1976), p. 60.

Parsons, Donald O. "Specific Human Capital: An Application to Quit Rates and Lay-Off Rates," Journal of Political Economy, Vol. 80, #6 (November/December, 1972), pp. 1120-43.

Pinera, S.: Unemployment, labor market segmentation, and the returns to educated labor. 34p. (1976) (International Labour Office. World Employment Programme Research. Population and employment working paper 33)

(Higher Education as an Investment, Continued)

Pollatschek, M.A.; Melnik, Y.; and Comay, Y. "Dropout Risks, Option Values and Returns to Investment in Schooling," The Canadian Journal of Economics, Vol. 9, #1 (February, 1976), pp. 45-57. COREJ w/e 2nd April 1976, p. 7.

Rice, C. Randolph. "A Descriptive Note on the Interstate Rates of Return from Schooling for Males, 1960 and 1970," The Annals of Regional Science, Vol. IX, #3 (November, 1975), pp. 73-79. COREJ w/e 28th November, 1975, p.2.

Solomon, Lewis C. "The Definition of College Quality and its Impact on Earnings," Explorations in Economic Research, Vol. 37, #4 (Fall, 1975), pp. 537-87. COREJ w/e 5th December, 1975, p. 3.

Taubman, Paul J. and Wales, Terence J. "Higher Education, Mental Ability, and Screening," Journal of Political Economy, Vol. 81, #1 (January/February, 1973), pp. 28-55.

Wachtel, Paul. "The Effect of School Quality on Achievement, Attainment Levels, and Lifetime Earnings," Exploration in Economic Research, Vol. 37, #4 (Fall, 1975), pp. 502-36. COREJ w/e 5th December, 1975, p. 3.

INDUSTRIAL AND VOCATIONAL EDUCATION

Branscomb, Lewis M. and Gilmore, Paul C. "Education in Private Industry," Daedalus, Winter, 1975, pp. 222-33.

American Vocational Journal, Vol. 50, #7 (October, 1975), CC, Vol. 7, #45 (November 10, 1975), Entire Issue.

IEEE Transaction on Education, Vol. 19, #3 (August, 1976). "Special Issue on Education in Industry-Some Approaches to Life Long Learning." CC, Vol. 8 #35 (August 30, 1976).

"Vocational Education Wave of Future," Change: The Magazine of Higher Education, Vol. 7, #9 (November, 1975), pp. 46-48. CC, Vol. 7 #47 (November 24, 1975), p. 52.

NON-TRADITIONAL STUDENTS AND PROGRAMS

Agnello, Richard J. and Hunt, Joseph W., Jr. "The Impact of a Part-Time Graduate Degree and Early-Career Earnings on Late-Career Earnings." The Journal of Human Resources, Vol. XI, #2, pp. 209-18.

(Non -Traditional Students and Programs, Continued)

Barbour, G. Jeffrey; Conger, Darius J. and Moor, James R., Jr, "Bringing the Campus to the Community: A Talking Paper on Community Service and Planning." Mimeo, Central Michigan University, July, 1975.

Boren, Nona, Terry, KaiMay Yuen, and McCally, Michael. "Second Careers: An Integrated Learning Experience in Career Change for Older Persons," Industrial Gerontology, Vol. 3, #2 (Spring, 1976), pp. 75-104. CC, Vol. 8, #30 (July 26, 1976), p. 52.

Entine, Alan D. "The Mid-Career Counseling Process," Industrial Gerontology, Vol. 3, #2 (Spring, 1976), pp. 105-12. CC, Vol. 8, #30 (July 26, 1976), p. 52.

Hsueh-wen, Wang. "The Half-work and Half-study System on the Chinese Mainland: History and Development," Issues and Studies, Vol. 11, #11 (November, 1975), pp. 12-24. CC, Vol. 7, #50 (December 15, 1975), p. 70.

McCormick, James P. "Business-Education Interaction for Mutual Growth," Educational Leadership, Vol. 32, #7 (April, 1975), pp. 457-60. CC, Vol. 7, #25 (June 23, 1975), p. 47.

Magnarella, Paul J. "The University of Vermont's Living-Learning Center," A First-Year Appraisal," The Journal of College Student Personnel, Vol. 16, #4 (July, 1975), pp. 300-05. CC, Vol. 7, #33 (August 18, 1975), p. 66.

Marver, James D. and Patton, Carl Vernon. "The Correlates of Consultation: American Academics in 'The Real World'," Higher Education, Vol. 5, #3 (August, 1976), pp. 319-end. CC, Vol. 8, #33 (Auugst 16, 1976), p. 70.

Mueller, Doris L. "Observing Student Teachers in a Competency-Based Program," Peabody Journal of Education, Vol. 53, #4 (July, 1976), pp. 248-53. CC, Vol. 8, #16 (August 16, 1976), p. 63.

Organization for Economic Co-operation and Development. Short Cycle Higher Education. Paris, OECD Publications Center, 1975. CC, Vol. 7, #25 (June 23, 1975), p. 43.

Peterfreund, Stanley. "Education in Industry--Today and in the Future." Training and Development Journal, Vol. 39, #5 (May, 1976), pp. 30-41. CC, Vol. 8, #22 (May 31, 1976), p. 67.

Quirk, Daniel A. "Education and Work: Bridging the Gap," Industrial Gerontology, Vol. 3, #1 (Winter, 1976), pp. 58-62. CC, Vol. 8, #16, (April 19, 1976), p. 57.

Reichow, Ronald W. and Scott, Robert E. "Study Compares Graduates of Two-, Three-, and Four-Year Programs," Hospitals, Journal of the American Hospital Association, Vol. 50, #14 (July 16, 1976), pp. 95-100. CC, Vol. 8, #33 (Auugst 16, 1976), p. 60.

(Non-Traditional Students and Programs, Continued)

Rogers, V.R. "Teachers Centers in the U.S.," Educational Leadership, Vol. 33, pp. 403-5, March, 1976. CC, Vol. 8, #30 (July 26, 1976), p. 10.

Stoddart, John. "Advance Needed in Business Education," Higher Education Review, Vol. 7, #3 (Summer, 1975), pp. 30-38. CC, Vol. 7, #48 (December 1, 19765), p. 45.

Thelin, John R. "Beyond the Factory Model: New Strategies for Institutional Evaluation," College and University, Vol. 51, #2 (Winter, 1976), pp. 161-64. CC, Vol. 8, #9 (March 1, 1976), p. 66.

Torrance, E. Paul; Bruch, Catherine B. and Torrance, J. Pansy. "Interscholastic Futuristic Creative Problem-Solving." The Journal of Creative Behavior, Vol. 10, #2 (1976), pp. 117-25. CC, Vol. 8, #35 (August 30, 1976), p. 74.

Vermilye, Dyckman W. (ed.) The Expanded Campus. San Francisco: Jossey-Bass, Inc., Publishers, 1972.

Wirtz, Willard. "Speaking from Experience," Training and Development Journal, June 1976, pp. 12-13.

Worden, L.M. and Thompson, D.R. "Problems Indicate the Need for Meaningful Change in Technology Education," IEEE Transactions on Education, Vol. 18, #4 (November, 1975), pp. 184-89. CC, Vol. 7, #47 (November 24, 1975), p. 51.

Young, Anne M. "Going Back to School at 35." Monthly Labor Review, Vol. 96, #1 (October, 1973), pp. 39-42.

Young, Anne McDougall. "Going Back to School at 35 and Over," Monthly Labor Review, Vol. 98, #12 (December, 1975), pp. 47-50. CC, Vol. 8, #4 (January 26, 1976), p. 106.

Zunker, Vernon G. "Students as Paraprofessions in Four-Year Colleges and Universities," The Journal of College Student Personnel, Vol. 16, #4 (July, 1975), pp. 282-86. CC, Vol. 7, #33 (August 18, 1975), p. 66.

STATISTICAL DATA

Baker, Curtis O. and Wells, Agnes Q. Associate Degrees and Other Formal Awards Below the Baccalaureate, 1972-72. NCES 76-100. Washington, D.C.: USGPO, 1975. JEL, Vol. XIV, #2 (June, 1976), p. 591.

Bureau of Labor Statistics, The U.S. Economy in 1985. Washington, D.C.: U.S. Government Printing Office, 1974).

(Statistical Data, Continued)

Bureau of Labor Statistics, *The U.S. Economy in 1985*. Washington, D.C.: U.S. Government Printing Office, 1974).

College Placement Council. *Men's Salary Survey, 1962-74*. Bethlehem, PA.: CPC Foundation, 1974.

Fetters, William B. *National Longitudinal Study of the High School Class of 1972: Comparative Profiles One and One-Half Years After Graduation.* NCES 76-220. Washington, D.C.: USGPO, 1975. JEL, Vol. XIV, #2 (June, 1976), p. 586.

Johnston, D.F. "Education of Workers: Projections to 1990," *Monthly Labor Review*, Vol. 93, #11 (November, 1973), pp. 22-31.

Milliken, William G. *Economic Report of the Governor, 1976*, Lansing, Michigan, March, 1976.

Podolsky, Arthur. *Basic Student Charges 1972-73 and 1973-74.* Washington, D.C.: U.S. Government Printing Office, 1975.

Tarver, James D. and Thompson, Billy H. "Projecting Regional and Subdivisional Populations through Simultaneous Equation Techniques," *Growth and Change*, Vol. 7, #1 (January, 1976), pp. 13-23. CC, Vol. 8, #11 (March 15, 1976), p. 88.

Whitmore, Bob. "Educational Attainment of Workers, March, 1975," *Monthly Labor Review*, Vol. 99, #2 (February, 1976), pp. 46-end. CC, Vol. 8, #12, (March 22, 1976), p. 78.

U.S. Department of Commerce. *Statistical Abstract of the United States.* Washington, D.C.: U.S. Government Printing Office, 1975.

U.S. Department of Health, Education and Welfare. *Financial Statistics of Institutions of Higher Education*. Washington, D.C.: U.S. Government Printing Office, Various Editions.

U.S. Department of Health, Education and Welfare, *Digest of Educational Statistics*. Washington D.C.: U.S. Government Printing Office, Annual Editions.

STUDENT GOALS AND ACHIEVEMENTS IN HIGHER EDUCATION

Adams, L.; LaMar, et. al. "Statistical Comparisons of Entrance Prediction Equations Using ACT or SAT Scores, or Both," *College and University*, Vol. 51, #2 (Winter, 1976), pp. 174-82.

Bisconti, Ann Stouffer. *College Graduates and Their Employers - a National Study of Career Plans and Their Outcomes.* The CPC Foundation, Report #4, 1975.

(Student Goals and Achievements in Higher Education, Continued)

Bisconti, Ann Stouffer and Gomberg, Irene L. The Hard-To-Place Majority - A National Study of the Career Outcomes of Liberal Arts Graduates, Bethlehem, PA.: The CPC Foundation, Report #5, 1975.

Chambers, M.M. "Higher Education: Access and Outcome," Intellect, Vol. 104, #2375 (May-June, 1976), pp. 587-79. CC, Vol. 8 #23 (June 7, 1976), p. 47.

Clark, Arthur John and Seals, James M. "Student Perceptions of the Social Status of Careers for College Gradutes," The Journal of College Student Personnel, Vol. 16, #4 (July, 1975), pp. 293-99. CC, Vol. 7, #33 (August 18, 1975), p. yy.

College Placement Council. Four-Year Liberal Arts Graduates. Bethlehem, PA.; The CPC Foundation, 1975.

The Journal of College Student Personnel, "A Student Development Model for Student Affairs in Tomorrow's Higher Education," Vol. 16, #4 (July, 1975), pp. 334-41. CC, Vol. 7, #33 (August 18, 1975), p. 66.

Crookshanks, J. Doug. "Predictors of Success and Status of College Students," Canadian Counselor, Vol. 9, #2 (Apr.Jun., 1975), pp. 117-25. CC, Vol. 7, #35 (September 1, 1975), p. 51.

Davis G. S. "Consistent Recruitment in a Graded Manpower System," Management Science, Vol. 22, #11 (July, 1976), pp. 1215-20. CC, Vol. 8, #31 (August 2, 1976), p. 71.

Ferguson, R.L. and Maxey, E.J. "Trends in the Academic Performance of High School and College Students," ACT Research Report, #70 (January, 1976), 8 pp. CC, Vol. 8, #15 (April 12, 1976), p. 53.

Fontana, David. "First Degrees in Education," Universities Quarterly, Vol. 29, #3 (Summer, 1975), pp. 258-64. CC, Vol. 7, #35 (September 1, 1975), p. 49.

Gruneberg, M.M.; Sykes, R.N.; and Monks, J. "Enigma Variations: The General Knowledge of University Students," Universities Quarterly, Vol. 29, #3 (Summer, 1975), pp. 265-71. CC, Vol. 7, #35 (September 1, 1975), p. 49.

Hoge, Dean R. "Changes in College Students' Value Patterns in the 1950's, 1960's and 1970's," Sociology of Education, Vol. 49, #2 (April, 1976), pp. 153-63. CC, Vol. 8, #22 (May 31, 1976), p. 23.

Johnson, Harry G. "Learning and Libraries: Academic Economics as a Profession: Its Bearing on the Organization and Retrieval of Economic Knowledge," Minerva, Vol. 13, #4 (Winter, 1975), pp. 621-end. CC, Vol. 8, #15 (April 12, 1976), p. 55.

Lindsey, R. "Rebels of the 1960's Depressed as They Reach 30," New York Times, 29 February 1976, p. 1, 40. CC, Vol. 8, #12 (March 22, 1976), p. 17.

Medley, Marris L. and Johnsen, Kathryn P. "The Economics of College Plans Among Black High School Seniors," The Journal of Negro Education, Vol. 45, #2 (Spring, 1976), pp. 134-41. CC, Vol. 8, #24 (June 24, 1976), p. 74.

Parelius, Ann P. "Change and Stability in College Women's Orientations Toward Education, Family, and Work," Social Problems, Vol. 22, #3, (February, 1975), pp. 420-31. CC, Vol. 7, #35 (September 1, 1975), p. 27.

Seltzer, Mildred M. "Contemporary College Women View Their Roles," The Journal of College Student Personnel, Vol. 16, #4 (July, 1975), pp. 265-69. CC, Vol. 7, #33 (August 18, 1975), p. 66.

Shackleton, J.R. "Economics for Non-Specialists," Higher Education Review, Vol. 7, #2 (Spring, 1975), pp. 33-41. CC, Vol. 7, #32 (August 11, 1975), p. 42.

Stone, E. "Women's Programs Grow Up," Change: The Magazine of Higher Education, Vol. 7, #9 (November, 1975), pp. 16-19. CC, Vol. 7, #47 (November 24, 1975), p. 52.

Urban League Review, "Black College Youth: Their Plans and Goals," Vol. 1, #1 (Spring, 1975), pp. 18-21. CC, Vol. 8, #23 (June 7, 1976), p. 32.

Wilson, Kenneth M. "Today's Women Students: New Outlooks and New Challenges," The Journal of College Student Personnel, Vol. 16, #5 (September, 1975), pp. 376-81. CC, Vol. 7, #47 (November 24, 1975), p. 52.

Zultowski, Walter H. and Catron, David W. "High Expectations Among Transfer Students and College Freshman; a Further Analysis of the Transfer Myth," The Journal of College Student Personnel, Vol. 17, #2 (March, 1976), pp. 123-26.